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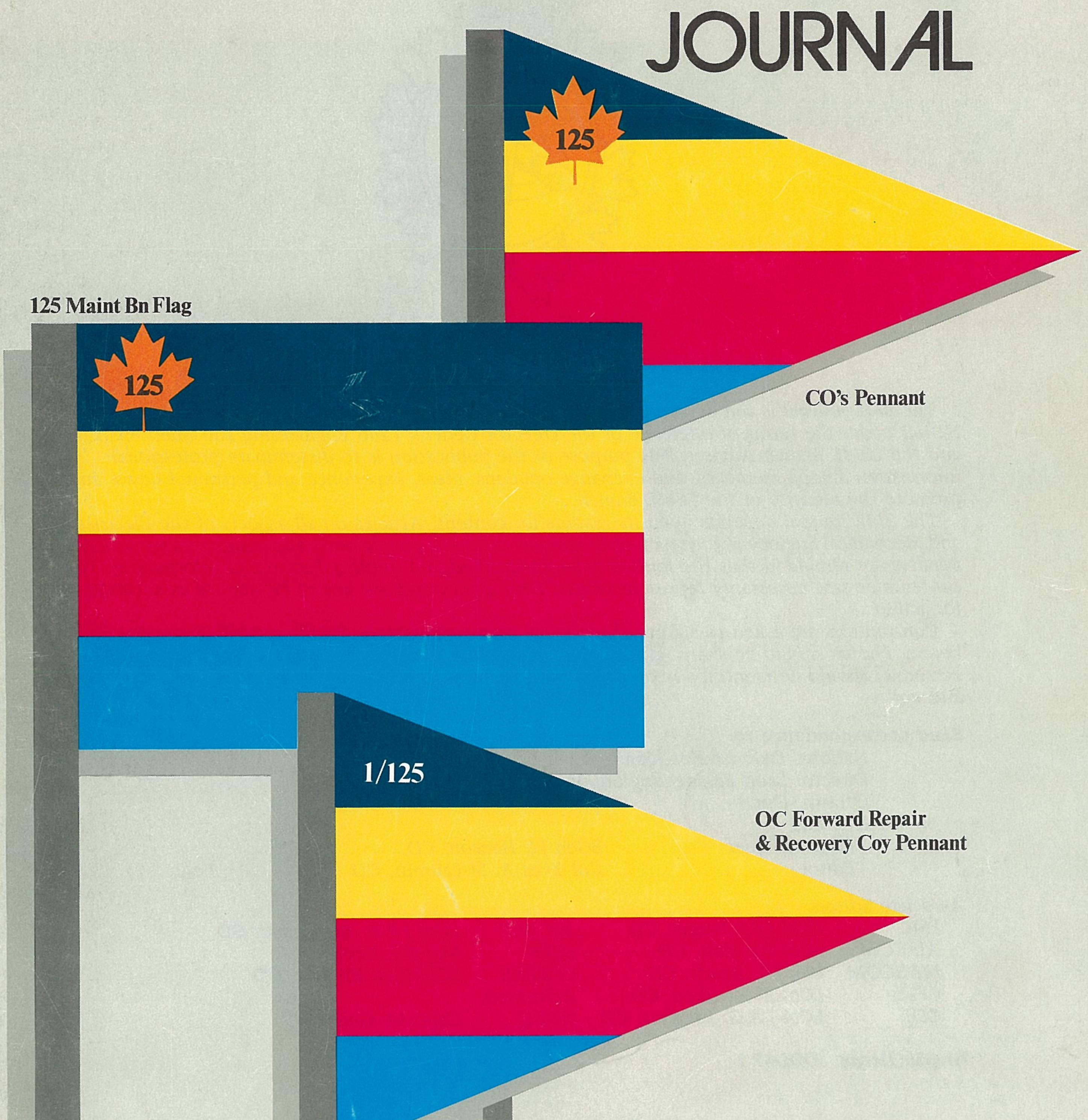

Canada

EME JOURNAL

The EME Journal is the magazine of the Land Electrical and Mechanical Engineers, published at NDHQ under the terms of reference of the Director General Land Engineering and Maintenance and the LEME Branch Adviser. The purpose of the publication is to disseminate professional information among members, and exchange opinions, ideas, experience and personnel news, and promote the identity of the LEME Branch.

The EME Journal depends upon its readers for content. Articles on all aspects of the Electrical and Mechanical Engineering System, photographs, cartoons, people news and comments are solicited. Readers are reminded that the Journal is an unclassified and unofficial source of information. The contents do not necessarily represent official DND policy and are not to be quoted as authority for action.

Contributors are asked to submit the original text typewritten, double spaced, paper size as herein. Photos should be sharp, glossy, black and white prints with captions typed separately. Personnel should be identified in all cases, both text and captions, by rank, initials, surname, trade and unit.

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IN THIS ISSUE

FEATURES

- From the Director-General Land Engineering and Maintenance and LEME Branch Adviser 2
- The Colonel Commandant's Column 3
- A Patron Saint for the LEME Branch 4
- Highlights of the 1988 Annual Conference of the LEME Association 4

LEME AND LONG TERM PLANNING

COMMAND UPDATES

- FMC Update 7
  - – 125 Maintenance Battalion 7
  - – Field MMMS 7
- CFTS Update 15
  - – Maintenance Management 15
  - – Scaling in Static Operations 20
- MARCOM Update 20
  - – MARCOM EME Working Group 1989 20
- DAME – Container Ammunition Plastic 22
- DLAEEM – FLIR Sights 24

DSVEM REPORTS

- DSVEM 2 – Field Support Vehicles 25
- DSVEM 3 – Replacement of Herman Nelson Space Heaters 25
- DSVEM 4 – Computerized Vehicle Simulation 27
- DSVEM 5 – Special Equipment Vehicle 29

CRAFTSMEN CORNER

- RCEME 50th Anniversary 31
- CFSEME Hosts 25th Annual LEME Bonspiel 33
- New Building at CFSEME 34
- CFSEME Francotrain Efforts 36
- New QL 6A Training 36
- Regimental Company Facilities 37

OCCUPATION ADVISERS UPDATE

- 421 Weapons Technicians Update 39
- 441 Material Technicians Update 40

202 WORKSHOP DEPOT UPDATE

- Leopard Repair and overhaul 42

LETE UPDATE

- Reliability and Maintainability Squadron – Sharpening the Competitive Edge 46

ETFC UPDATE

- 20th Anniversary for ETFC 49

From the Director General Land Engineering and Maintenance and LEME Branch Adviser

For over two years now, the LEME Senate has been debating the ideal classification structure for LEME Officers. The debate is far from over, as it must include such controversial topics as staff training, post-graduate courses, line versus staff employment, and the training and occupational patterns needed to help all our officers fulfil their potential.

Once we have arrived at something approaching a consensus, a Branch Adviser's letter will be prepared on the subject. In the meantime, there are two characteristics that the Senate agrees are fundamental to our classification: all LEME personnel, regardless of rank, must have a solid grounding in technology, and all must have leadership potential if they are to have full careers in the Branch.

LEME Officers usually enter commissioned rank with a technological background earned as technicians in the non-commissioned ranks, or with university engineering or science degrees, or through community college technology programs. Phase training then tests and assesses their leadership and management skills before they are considered qualification qualified. CFR and SRCP officers, of course, usually have extensive leadership and management experience and may thus not have to take all phases of officer training. Junior officers are then usually given tours in the Land Maintenance system early in their careers to acquaint them with the joys and pressures of serving in workshops, and to give them first-hand experience working with our military and civilian technicians in field or static units in Canada or in Europe.

The opportunity to be selected for greater challenges must be earned in these formative postings, both through satisfactory performance on the job and through successful completion of OPDP and FOE. These are essential steps on the way to staff, technical staff and post-graduate training and the more demanding staff and technical appointments at the rank of major and beyond.

Our technicians get their initial grounding in technology through OQ3 and OQ5 courses at our schools and OJT OQ4 at their first posting. From there on they earn subsequent formal technical and leadership training like JLC and SLC through performance on the job. Their formal training culminates at the OQ7 course, designed to make them full-fledged LEME sergeants-major.

The message, I hope, is clear. No one gets to be a Chief Warrant Officer or a Colonel in the Branch without first proving themselves in a range of technical and leadership challenges as junior officers or junior senior NCOs. The Branch and the CF, through your supervisors and of course our career managers, will provide you with the opportunities. The rest is largely up to you.

I hope this provides you with some idea of the Branch's enduring ideas about leadership in the Army's only Branch dedicated to engineering and maintenance. The Branch Chief Warrant Officer and I look forward to debating these issues with you via the finger in the chest technique as we travel around over the next few months.

Arte et Marte.

The Colonel Commandants Column

As this is the first article by the Col Comdt for some time it is deemed acceptable to say a few words about the role of the Col Comdt. The Col Comdt represents *all* members of the LEME Branch in the Permanent and Reserve Forces and those in the LEME Association and that means that he is accessible to all through the SO LEME and similarly he is given a priviledged access to all members. The Col Comdt has no direct authority in the Branch but he has influence, a power to be used carefully for the welfare of the Branch.

Since receiving the honour to represent the young but battle proven, proud, effective LEME Branch I have represented all LEME members at; Change of Command ceremonies of Permanent and Reserve Force Service Battalions, meetings of Command maintenance staffs, meetings of the LEME Association, CDA and honorary Cols and Col Comdts, the consecration of the Guns and Colours of the AD Regt, the presentation of awards to Militia Maintenance Companies, the presentation of graduation certificates and awards to new LEME officers, the honouring of our War Dead in Canada and abroad, and the visit to many headquarters and units where the Senior LEME person felt that the visit from the Col Comdt would be effective. An effective and enjoyable part of my task is to visit the members of the Branch of their places of work and to talk with everyone and to let everyone talk to him.

In the numerous visits with individuals and units I can say without a great danger of contradiction that there is a vibrant vitality in the Branch with a very positive outlook to the challenges of implementing the Total Force Concept. The Reserve and the Permanent Force members appreciate more and more each others strengths and in concentrating on these they note that their perceived weaknesses of the other are diminishing to manageable levels. The Association Chapters are also becoming more active and they will fulfill their role, among other things, to make the Total Force Concept more acceptable to the Canadian public. The positive attitudes of the members also contributes greatly to true job satisfaction and frequently I hear comments like, "I like what I'm doing" or "I want to do more and here is what I suggest we do so I can, etc..." and so on.

There is also a clear understanding that it is very important that everything the members of the LEME Branch do, be it training, engineering, Life Cycle Material Management, staff work or on the ground maintenance, modification, inspection and recovery of assigned equipments, it is all done to ensure that the operators have the required operationally ready equipment, and to really enjoy meeting those challenges. The Col Comdt cannot fail if he does no more than to use his appointment to increase the enthusiasm of all members to serve this beautiful country Canada by working within the Tenets of the Branch and to find joy and satisfaction in a job well done.

In closing, members of the LEME Branch are reminded of the Branch Motto — Arte et Marte. Through Skill and Fighting we gladly serve.

A Patron Saint for the LEME Branch

Summary of Saint Jean de Brébeufs' Life

Jean de Brébeuf was born March 25, 1593, at Condé-sur-Vire, Normandy. He belonged to a noble family, from which, according to the Biographie Universelle (Paris, 1843–66), the English family of Arundel had its descent. Entering the Society of Jesus Nov. 8, 1617, at Rouen, he was ordained five years later; and in 1625 was sent to Canada as one of the first Jesuit missionaires. The first year he spent among the Montagnais; but in 1626 went, with De Nouë, to the Huron country, where they settled at Toanché (known to the Récollets as Carhagouha) in the bark cabin which Le Caron had erected eleven years before. Here Brébeuf remained (alone, after the first year) until the capture of Quebec. Returning to Canada with Champlain (1633) he at once resumed work in the Huron country, where he labored until his death (except during 1641–44, when at Quebec). During the winter of 1640–41, he endeavored (but without success) to establish a mission in the Neutral Nation. He lived successively at Ihonatiria, a new village built not far from the deserted Toanché; Teanaustayé called by the missionaries St. Joseph, in the present township of Medonté, Simcoe County, Ontario; and St. Ignace and St. Louis, about half way between the former towns. In March, 1649, a thousand Iroquois attacked and destroyed the last two-named villages, capturing there Brébeuf and Gabriel Lalemant, both of whom were put to death with cruel tortures, – the former dying March 16, the latter on the day following. Their bodies were rescued by their brethren, and their bones afterwards taken to Quebec, – where, in the Hotel Dieu, Brébeuf's head is still preserved, enclosed in a silver bust sent from France by his family.

Highlights of the 1988 Annual Conference of the LEME Association

by Colonel (Ret'd) M.C. Johnston

These highlights provide a miscellany of points of interest arising from the Council Meeting and the Annual General Meeting during the Conference. These highlights are not intended as a complete or authoritative record. Rather they are intended in stimulate interest in Association affairs. Any comments or observations are those of the author.

COUNCIL MEETING

Colonel J.G.G. Nappert, the Commandant CFSEME, noted that the school was very active and operating at full capacity. 48 Phase Four students were graduated last fall. 35 more should graduate this fall and 12 more next spring.

The EME Reserve School (EMERS) was formed in 1987. 8 courses were conducted that year with 58 graduates 22 courses were conducted in 1988 with 178 graduates. This program is now running at about full capacity considering existing staff and facilities available. Special credit for the success of the program goes to Major Stan Gill of the Toronto Service Battalion.

The school headquarters has been moved to a new building. Sadie now stands guard again at the entrance to the headquarters just as she did at the White House in Barriefield. Another new building is being constructed across the road from the school headquarters for weapons/armament training. It has been suggested that this new building be named the Lesieur Brodie building when it opens next year. The fall of 1989 should see the start of construction of a new $25 million 13000 square meter building for vehicle technician training. This building should be opened in three years.

A presentation on the *Implementation of the White Paper* was led by Colonel J.A. Boucher, DCOS Logistics at HQ FMC. RV89 will be the last FMC concentration in the current format. 1 Canadian Division will become operational effective 1 December 1989.

Intensive work is now under way to develop the structure for the army field force. Entitled *Army 2002* this will be a total force, regular and militia, and will be based on the regimental system. 1 Canadian

Division will comprise 2 brigade groups, an artillery brigade, a logistics regiment plus engineers signals etc., and will be part of Allied Command Europe. A territorial (defence of Canada and quick reaction) task force will comprise 2 brigade groups, one regular and one reserve, the Airborne Regiment and a logistics regiment. The infrastructure will be based on the four militia areas.

Each logistics regiment will include a maintenance battalion. Each of these battalions will include regular and reserve technicians. The exact ratio between the two will be different for each battalion. Thre was extensive discussion on to what standards reserve technicians would be trained and how they would be trained.

The *Unit Reports* reflected the hard work of a small but dedicated part of the militia. The reports also highlighted many problems, particularly those of accommodation. One maintenance company had no building at all. Several others had inadequate or poorly maintained workshop areas. Such complaints highlight the requirement for adequate workshop space in order for the LEME militia to meet its Army 2002 commitments.

ANNUAL GENERAL MEETING

Brigadier General J.I. Hanson, the DGLEM, noted that the number of officers in the Branch had increased to 400. However, the Branch is still 50 officers short, mainly experienced captains and junior majors. The branch is getting larger mainly because of the extensive capital acquisition projects which require project managers and staff.

General Hanson noted the requirement to build up strong cadet corps. Former cadets are a rich source for recruiting for the regular and reserve force. The Association, particularly its chapters, is encouraged to support the cadet corps.

Major General P. Neatby, the President of the Friends of the War Museum, spoke of the problems of the Canadian War Museum (CWM). The CWM has an 800,000-item collection. The art portion alone of this collection is valued at $400 million. However, due to lack of space only about 4% of the collection is on display. All of the CWM's facilities, the museum building itself and the warehouse are in desperate need of repair if serious damage to the collection is to be prevented. $56 million is needed for a new building to house the complete collection. Government spending to this level is not expected in the near future because of the large amounts recently spent on the new National Gallery and Canadian Museum of Civilization. However, $14 million should be spent now to improve existing facilities.

The Friends of the War Museum was formed to lobby to get support for the necessary improvements for the Museum. During the discussion after the presentation it was agreed that the LEMEA would investigate ways for the Association becoming associated with the Friends of the War Museum.

The Annual Financial Report as presented by the treasurer, Lieutenant Colonel Bob Hilliard, showed on operating loss of $826 for the past year. This is the first such deficit in many years. The main reason for the loss is a one-time unplanned reduction in the CDA grant of $2000. Similar reductions were applied to all associations. The funds so saved by the CDA were used to finance the operating losses of the Forum magazine. It is expected that the full grant will be reinstated next year.

In his report on the *Canadian Institute for Strategic Studies*, Colonel (Reid) M.C. Johnston tabled a brief report summarizing the last two semiars.

Fall 1987 — A Grand Strategy for the United States. Major challenges face the West in the 1990s. Because of its trade deficits, the United States cannot continue to underwrite everybody's security. United States' presence will be reduced in many trouble spots which will increased defence spending by the allies. Notwithstanding the fact that Soviet buildup continues unabated, public perception of lessened Soviet threat means allied cohesion must be strengthened.

Spring 1989 — Airwar 2000. The North Warning System is a stopgap measure for NORAD until spacebased radars are deployed. NATO's airpower advantage in Europe is gone. The Warsaw Pact has more aircraft, technological parity and improved pilot capability. The United States is undergoing a major R&D program to recover technological superiority. Air Command plans to reduce the number of types of its aircraft from 23 to 17 and expand the number of roles for each type of aircraft.

He noted that the trend of topics for these seminars was at the geopolitical/disarmament level. Although these are topics of vital interest to all association members, they do not deal with the industrial defence topic which is of special interest to the LEMEA.

Colonel Johnston went on to briefly outline the recent formation of the Canadian Defence Preparedness Association (CDPA). He noted that the CDPA is closely aligned to the defence-industrial interest of the LEMEA. Membership in the CDPA is drawn from both the private and public sectors and includes individuals, corporations and departments. It was agreed that the Association should investigate developing an association with the CDPA.

The *Publicity Committee* report recommended the promotion of military engineering to high school students particularly during careers days. This is a good project for chapters to undertake.

The *Resolutions* this year dealt mainly with problems in accommodation, terms of service, spare parts availability and regular force support. Of the 11 resolutions presented, 6 were accepted for onward transmission to CDA and 8 to FMC. A more detailed report on the results will included in the next newsletter. Nunquam nonparatus.

LEME and Long Term Planning

By Col Y.A. St-Laurent

Over the past two years, we have heard statements and commitments towards changes which should affect the Forces and the Department in ways and magnitudes comparable to those experienced following the commitments of Canada at the outset of WWs I and II. The level and tempo of efforts sustained by the operational staff to react to ministerial direction and military guidance was that of wartime urgency. Engineering and maintenance staffs have been intimately involved at National and Command Headquarters' level into the planning and projecting processes which resulted in the publication of the CF Total Force Development Plan in the fall of '88. This involvement has not necessarily been obvious to maintenance personnel in the field but for some indications that it was not business as usual.

The plans and the information which have been transmitted to the troops to date on what the Canadian Forces will look like in year 2002 have already generated a great deal of work towards their implementation. They have also generated some uncertainty and apprehension about our ability to meet those challenges as planned. This uneasiness has translated itself into a great thirst for knowledge on projected changes of policies, practices and procedures as well as requests for the EME plan supporting CF 2002.

To date there has been no stand alone EME plan catering for the evolutionary change of the Branch over the next fourteen years through its various components of people, structures, facilities and operations, nor is there likely to be one issued in the short term. The reasons for this include the fact that the EME staff input has been provided throughout the planning and staffing process which has evolved over the past two years at great expense of time and effort which left little for internal Branch matters. Also, until the operational end focus becomes clearer and passes the test of validation, our supportive role cannot be very precisely determined and defined in detail.

Individually and collectively, we have an essential role to play in the development of the Forces towards the twenty-first century. There are four major challenges which must be tackled by all members of the Branch. First, to keep up with the technology as it applies to the business of military applications; second, to keep up with the evolution of operational concepts as the technology impacts on them. Our involvement with most land equipment acquisition and in-service management activities puts us in a privileged position to meet and win those challenges. Third, learn to manage as well as perform engineering and maintenance functions; and fourth, learn to integrate all of the maintenance and engineering resources available to us in supporting our activities and endeavours. These include, aside from our own Branch resources, those of other Branches of the CF involved with engineering and maintenance functions or their support, the great number of civilian employees, members of the Reserves, and civilian industry. I must emphasize that integration and management does not imply possession of resources but does imply utilization and control of contributions.

It is comforting to remember that the creation of our Branch resulted from the demands of wartime conditions, lessons and obligations. It was not the result of peacetime "nice to do", "looks good on paper" bureaucratic motivations. It has proven itself since its creation and as it has evolved over the past forty-five years. There have been high and low points, however, the basic justification remains valid and current in spite of the various ideological and organizational fashions tried over the years.

Nevertheless, the requirement for a long-term Branch plan is recognized and some tangible work is being undertaken to produce one. I hope to be able to provide you with more concrete evidence in the coming year as some of the higher level decisions are made and as some of the fundamental frameworks relating to Regular/Reserves integration, training, employment and other personnel related concerns are defined.

Long Term Planning is an essential function of any organization aiming at keeping up with the constant evolution of the environment surrounding it. It allows to focus energy and progress and allows to control change rather than react to it, a very costly modus operandi. There is action underway to provide the Branch with a dedicated Long Term Planning capability in the foreseeable future. You will be kept informed as this initiative progresses.

Command Updates

FMC Update

125 Maintenance Battalion

by: LCol G.A. Walsh
CO 125 Maint BN

BACKGROUND

The aim of RV 89 is to train the FMC Div for war in Central Europe. One of the key objectives of this major exercise is to form and test the operational effectiveness of the Corps 86 Divisional Support Group (DISGP) in providing second line Combat Service Support (CSS). The CSS concept of operations is based on the formation of composite CSS organizations of Coy size for the direct or immediate second line support of 1 and 5 Bdes. These organizations are called Bde Support Units (BSUs) and represent the Bde Svc Bns of the Corps 86 doctrine. Their maintenance support role is restricted to in situ repairs of "A" vehicles and priority "B" vehicles only. The remainder of the second line maintenance support to the Bdes and Div Tp units is to be provided by a Maintenance Battalion (Maint Bn).

FMCHQ provided several guidelines to be considered in the preparation of organization and establishment tables for the RV 89 Maint Bn. These guidelines are as follows:

a. 1 Svc Bn HQ and Adm Coy will form the basis of the Maint Bn command and control structure.

b. Normal peacetime command relationships within the current Svc Bn Maint Coys is to be maintained as much as possible.

c. Maint Coys of 2 and 5 Svc Bns will be self sufficient and detached to under command 1 Svc Bn.

d. The RV 89 Maint Bn structure should, where practical and possible, parallel the organization being planned for the Allied Command Europe (ACE) Div.

ASSUMPTIONS

Whereas the guidelines above represent parameters of the RV 89 problem, it was felt that in the interest of longer-term development, we must also be guided by the following basic assumptions:

a. **Resources**. The availability of manpower and equipment for both RV 89 and any Canada-based DISGP over the next 10 years will be limited to the combined current establishments of the three existing Svc Bns, with only minimal augmentation by militia and other FMC units.

b. **Army Structure**. Restructuring, for the purpose of practicing in Div-level operations, is only a temporary measure (ie. it must be reversible). Nevertheless, it should be expected to take place with increasing frequency and efficiency. Therefore, the manner in which we organize DISGP units for RV 89 should be chosen with a view to refining and repeating this process in the future.

c. **Doctrine**. It was assumed that the organizations and operating systems described in Corps 86 doctrine publications represent currently accepted ideals for CSS operations at Div level.

BUTTONS AND BOWS

The first and easiest problem faced when developing the Maint Bn concept was what the name should be and what our flag should look like. It doesn't take much of an imagination to figure out where 125 Maint Bn came from. Each of the three digits represents the parent Svc Bn of the Maint Coys which make up the nucleus of the Maint Bn.

The flag was a slightly more difficult decision. There were those who wanted the old RCEME flag with the original three colours. On the other hand there were those who wanted to retain the current EME flag with four colours. It was decided that we would continue to build on our more recent traditions and stay with the EME flag but with a maple leaf in the top left corner to indicate we were part of FMC Div. The Maint Bn flag and senior officers pennants are depicted on the cover of the journal.

125 MAINT BN ORGANIZATION

When faced with the decision of whether to structure the Maint Bn with functional coys or with composite coys it was directed by the CO that a Service Paper be written to examine all the factors affecting this decision so as to ensure the viability and feasibility of the organization. The key factors considered in the Service Paper were:

a. **Command and Control**. The command and control systems within an organization such as a Maint Bn must not only be able to direct the operation of its subordinate components but must also be able to respond to the needs of the formations and units being supported. In examining the organizational options for the Maint Bn it was necessary to establish the degree to which commanders are able to exercise the best control over groupings of similar vs dissimilar resources and functions; the ease of monitoring work status, and the organization's flexibility for responding to changing support requirements. It was essential that the adopted Maint Bn structure provide the best possible service to the FMC Div.

b. **Restructuring**. Although regulations, orders and SOPs exist to ensure consistency in the manner in which command and administrative relationships are exercised, it is also understood that familiarity and built up loyalties amongst personnel within a unit are very critical and important to the effective operation of that unit.

c. **Self-Sufficiency**. In order to be capable of operating efficiently, a maintenance field unit and all of its sub-elements require ready access to a number of services, including clerical support, supply, equipment maintenance, transport (all of which can be grouped under the heading of "workshop support"), and repair parts support. Normally, a Coy is the lowest level at which these services are provided by a self-contained cell. Furthermore, it was considered essential that each Maint Coy of the Maint Bn have its own integral repair parts organization. The problem of repair parts support, therefore, was complicated by the need to consider the requirements of the Supply Bn and BSUs, in addition to those of the Maint Bn itself. The second line repair parts holdings that exist within the three current Svc Bns had to be divided amongst six organizations.

d. **Augmentation Requirements**. The structure of the Maint Bn was limited by the availability of manpower and equipment resources. To ensure the practicability of our organizational proposal, it was important to minimize its augmentation requirements.

e. **ACE DISGP Comparability**. The lessons learned on RV 89 must be applicable to the ACE Div's plans and organizations. Thus, it was considered important that the structure of the RV 89 Maint BN parallel that of the ACE DISGP Maint Bn.

OPTIONS

You will recall that each Svc Bn Maint Coy is divided into a Main Repair Group (MRG) and a Forward Repair Group (FRG). In each of our options elements of the FRG from each of the Maint Coys was detached to form the Maint portion of the BSUs. The two options considered when developing and forming 125 Maint Bn were:

a. **Composite Maint Bn**. The composite option envisions the three existing MRGs as composite (vehicle, weapons, electronics, materials, etc) maint coys under command of a Maint Bn HQ. These coys would retain the primary responsibility of providing maint support to their respective parent formations (ie. 5 Maint Coy supports 5 GBC). Support to the Div Tp units would be divided up amongst the three composite coys. The reallocation of some resources and/or workload would be necessary to balance support and deal with the unique equipments (guns, engineer plant, etc) of the Div Tp units. A proposed organization outline of the composite option is shown below.

b. **Functional Maint Bn**. Although the DISGP Maint Bn described in Corps 86 doctrine has five functional coys, and the ACE DISGP Maint Bn has four, the option considered for RV 89 consisted of three functional coys. The reason for this was that this organization best fits the resources available in the three current Svc Bn Maint Coys while also meeting a sensible division of production functions. The difference between the ACE Bn and the RV 89 Bn is the recovery and forward repair functions are combined under the one coy in the RV 89 structure. The concept of operations of this functional option is intended to follow doctrine as much as possible. The Maint Bn provides second line maint support to Div Tp

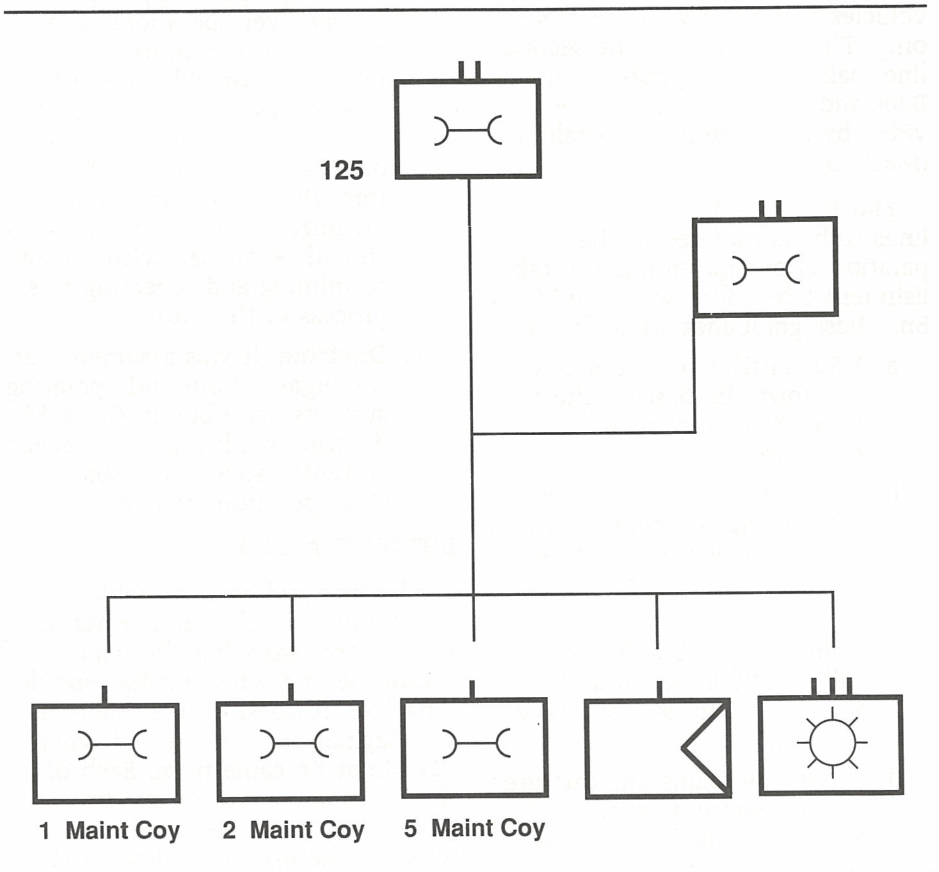


Fig 2: Composite Maint Bn

units, and backup support to that which BSUs are providing to their respective formations. The recovery concept includes a network of Equipment Collection Points (ECPs) which are distributed throughout the Div area and serve as contact points for the receipt of equipment into the Maint Bn. The organization of the functional concept is as shown below:

Both the Composite and Functional organization options satisfy the essential criterion of self-sufficiency, however, both have disadvantages with respect to repair parts structure requirements to support them. Neither option requires any significant degree of augmentation.

The Composite option has the advantage of minimizing the requirements to restructure existing organizations, and is thus the least disruptive to "peacetime" command relationships. The Functional option, on the other hand, may forego the advantage of familiarity within any given sub-unit, but it retains that familiarity at the platton level and it is more responsive to changes in operational groupings and it creates a clearer division of responsibility and accountability by grouping all similar resources under a single commander.

The Functional option is also far more conducive to an evaluation of the proposed ACE DISGP structure. Unlike the Composite option, the Functional organization should not result in command and control problems that are artificial (ie. not applicable in some sense to the ACE DISGP Maint Bn). Furthermore, the volume of repair parts required by each of the production sub-units can be minimized if they are organized along functional lines. Finally, the Functional organization is consistent with doctrine and would thus serve as a test organization with respect to the future of the FMC and ACE DISGPs.

It was decided that the RV 89 Maint Bn will be structured along functional lines and operate in accordance with Corps 86 doctrine. The Bn will consist of a HQ based on 1 Svc Bn HQ augmented with additional Maint expertise, three functional Coys and the 1 Svc Bn Adm Coy. The Forward Repair and Recovery (FRR) Coy is to be based on 1 Svc Bn Maint Coy HQ, the Vehicle (Veh) Coy on 2 Svc Bn Maint Coy HQ and the Weapons and Electronics (W&E) Coy and 5 Svc Bn Maint Coy HQ. Functional plattons are to be provided from each of the Svc Bn Maint Coys and placed under command the functional Coys. Each of the functional Coys will have its own HQ and its own Control Office responsible for planning, loading and controlling their workload. Bn HQ will monitor the workload in each of the Coys and hence be capable of cross-loading, allocating resources, monitoring, and setting priorities in keeping with Div policies.

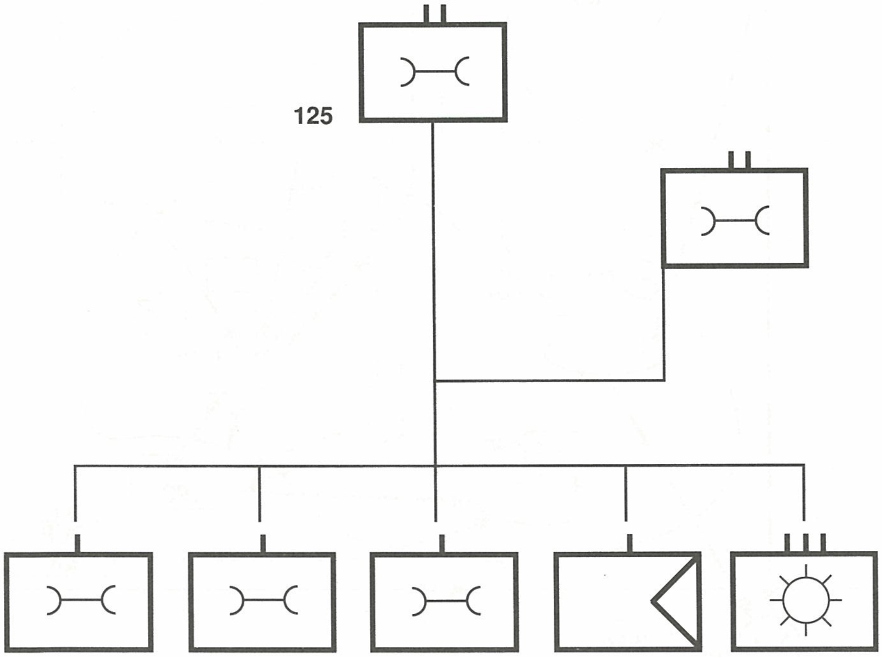


Fig 3: Functional Maint Bn

CONCEPT OF OPERATIONS

125 Maint Bn will train and deploy tactically as part of the FMC DISGP and provide second line maint support to the FMC Div. A complete set of Standard Operating procedures (SOPs) have been developed, written and tested for use on RV 89. A DISGP level Command Post Exercise (CPX) was conducted in Oct 88 to test Div SOPs and a Maint Bn CPX is planned for Mar 89 in BFC Valcartier to confirm and put the final touches on the Maint Bn SOPs.

The Bn will deploy tactically within the Division Administrative Area (DAA) as four independant Coys as shown in Figure 4 . The Repair Parts F1 HQ will deploy as part of Adm Coy. The FRR Coy will deploy as far forward as possible (near Bde rear boundary) to facilitate the provision of a quick response to in-situ repair and recovery requests. Because of the more static nature of repairs conducted by the W&E Coy and the requirement for the calibration and cleanliness of sophisticated electronics equipment; it will deploy as far to the rear of the DAA (near Div rear boundary) as possible. The Veh and Adm Coys may be dispersed throughout the DAA. The figure below depicts the tactical deployment and operation of 125 Maint Bn.

Maint operations can be functionally classified as follows:

a. Vehicle repair;

b. In-situ repair;

c. Recovery; and

d. General and Technical (G&T) repair.

For RV 89 the following responsibility groupings have been made to conform to the resources available and the structure of the functional Coys of the Maint Bn:

a. vehicle repair by Veh Coy;

b. In-situ repair and recovery by FRR Coy; and

c. G&T repair by W&E Coy.

The FRR Coy will effect in-situ repair support to Div Tp units and augment BSU in-situ repair support where necessary. The FRR Coy will also provide all recovery support to the entire Div. Units/Formations will send their repair/recovery requests through Bn Ops as illustrated in Figure 4. All other vehicle repair will be conducted by Veh Coy either via direct delivery by first line units to Coy location or through the ECPs. The work flow for in-situ repair and recovery requests is illustrated at Figure 5.

125 Maint Bn will be able to establish three ECPs. The ECPs will be manned by one vehicle and two personnel from Veh Coy and will be under command of Veh Coy. FRR Coy will have a standing task to clear ECPs. At the ECP, a cursory inspection will be done to confirm the diagnosis. The ECP planned work flow (ie. whether ECP backloads directly to BLP or Veh Coy) is a decision taken by the CO, and is dependent upon the tactical situation and the workload situation within the Maint Bn. The work flow for vehicle repair through an ECP is illustrated in Figure 6.

Most of the general and technical equipment to be repaired by W&E Coy will arrive via the Delivery Point (DP) with some being delivered directly by first line units. Equipment that has been repaired will be returned to the unit via the DP system. The work flow for equipment delivered directly to the Maint Bn is illustrated in Figure 7.

The Maint Bn HQ will not have a central control office as such. All functional Coys will control and load their own workshops. A workshop production reporting system is being developed with DLES and the Maint Bn staff which will allow the Maint Bn HQ to monitor production in each of the functional Coys and thereby control backloading, cross loading, cannibalizing and robbing.

LOMMIS/ADP

125 Maint Bn will utilize a field MMMS developed by 5 Svc Bn Maint Coy to create production data and monitor production output in each of the functional Coys. Each Coy and Bn HQ will be equipped with a lap top computer and all reports and returns will be automated. DLES is developing the software which will allow Bn HQ to not only gather valuable production data but will also give Bn HQ daily visibility within the functional Coys of their production status.

Two basic processes are required to gather the data base from which all necessary production reports and returns are generated. They are:

a. time accounting; and

b. job progress monitoring;

Time accounting is fully developed in CFTOs. In the field, however, daily and/or point in time production situation reports are required in order to give up to the moment advice to the chain of command on the operational maintenance status of the Div. Procedures were therefore developed and included in Maint Bn SOPs which will allow the Maint Bn to monitor job progress in a field environment.

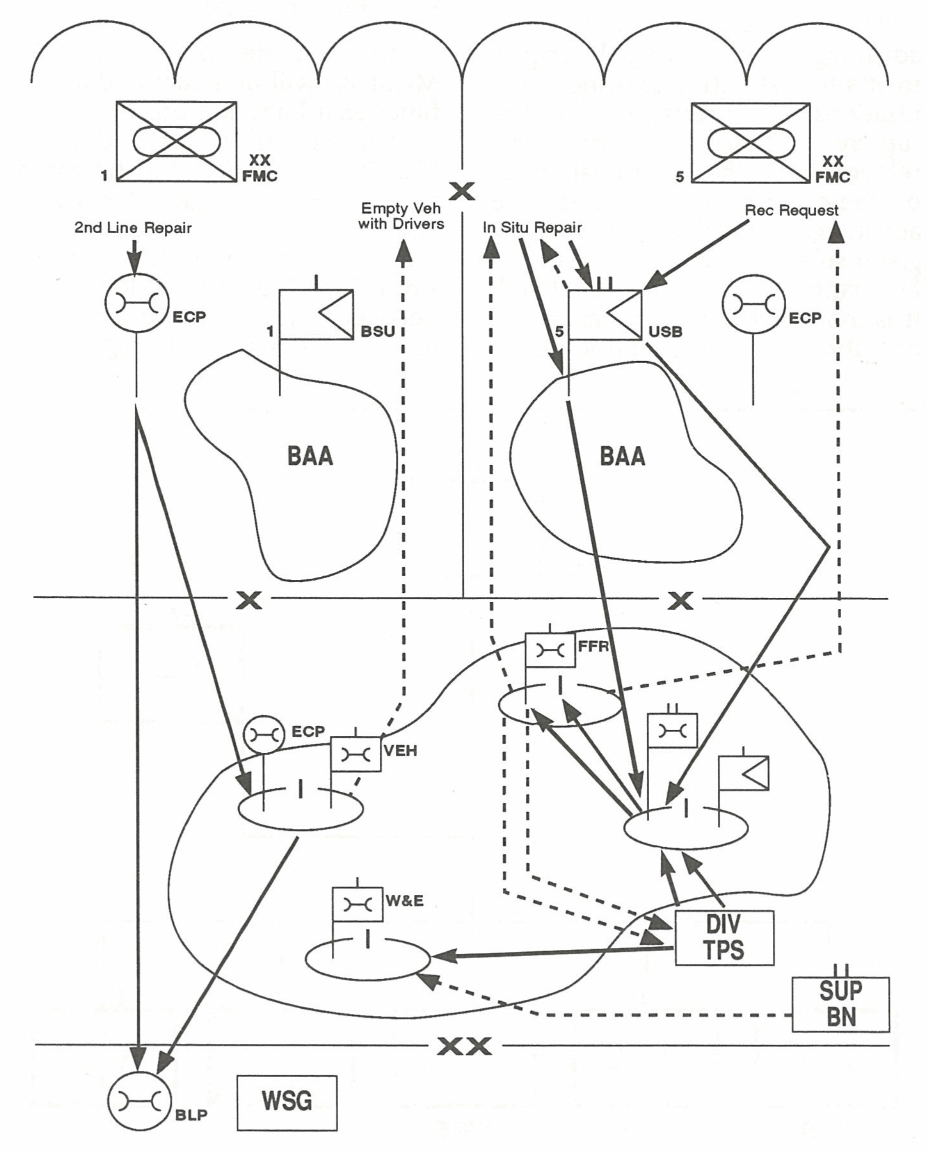


Figure 4: Tactical deployment and operation of 125 Maint Bn

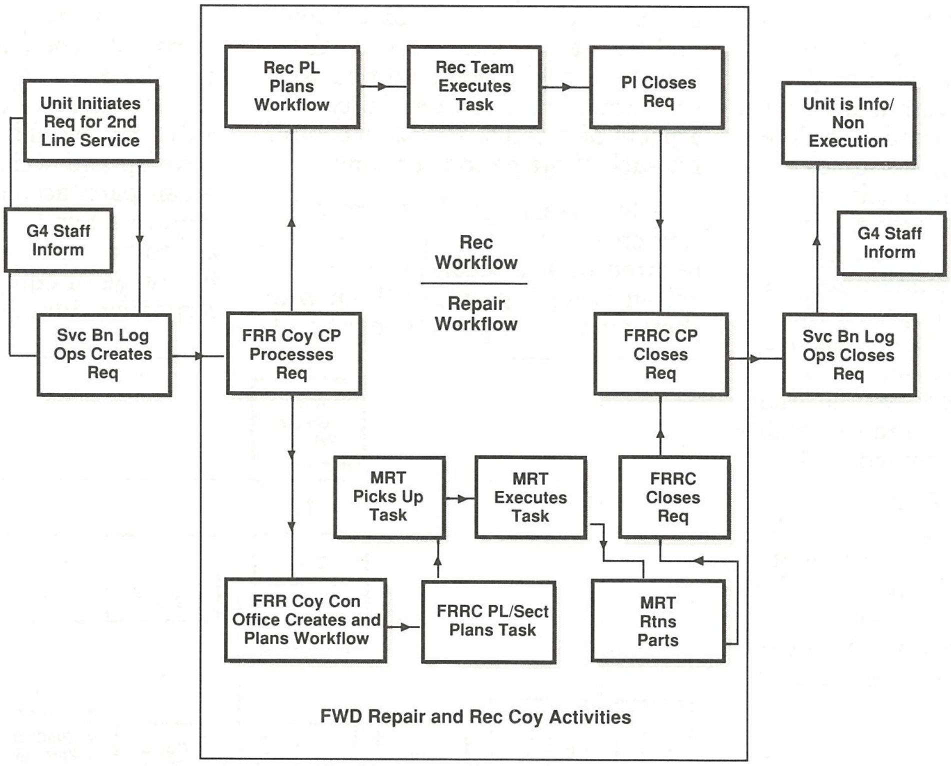


Fig 5 – Workflow in Situ Repair/Rec Request

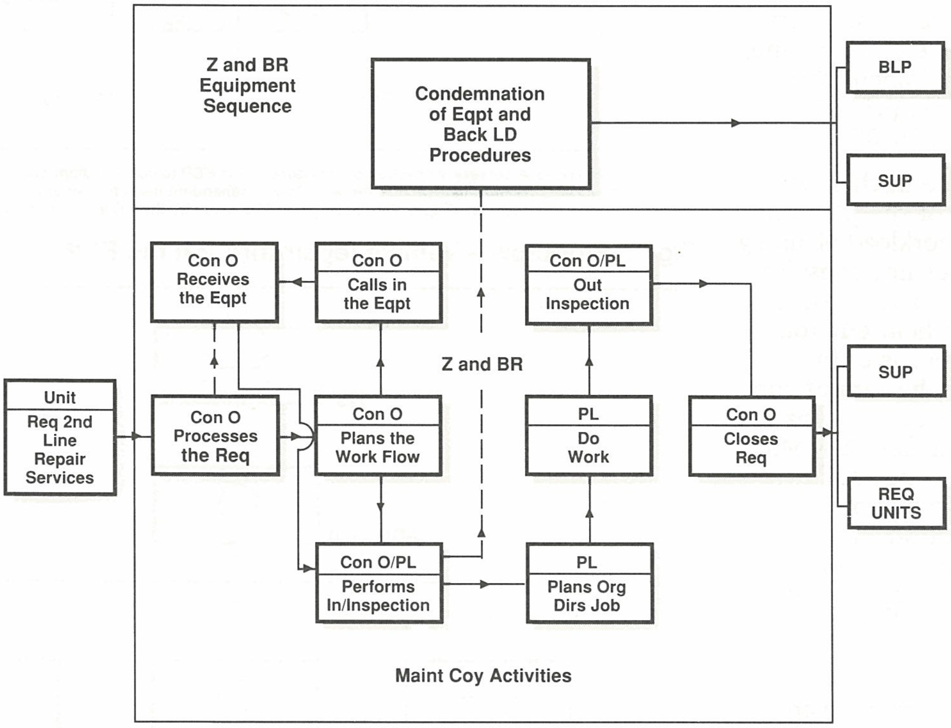


Fig 6: Workflow – eqpt repair brought directly to maint coy

The RV 89 Maint management procedures have been developed with the aim of retaining control of the jobs within the Coy Control Offices but at the same time providing the platoon commander with the freedom to plan and complete single jobs when the resources under his control are available. MMMS was designed for a static workshop environment with all three lines of maintenance responsibility. Field workshops, on the other hand, have only second line responsibility but are subject to many external factors beyond their control which require a more flexible approach to production control.

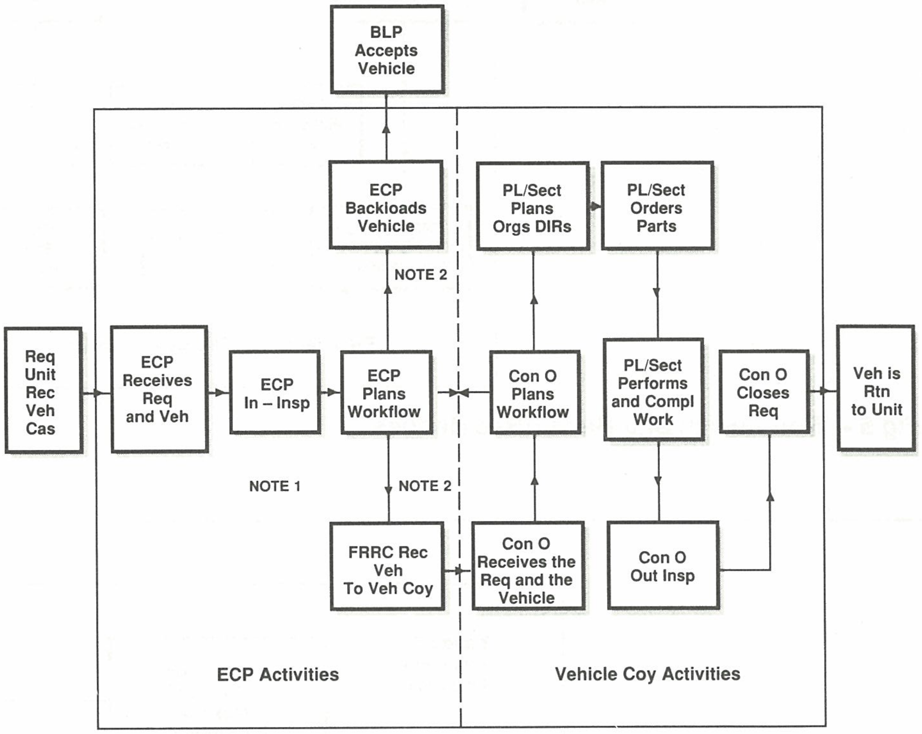
The Work Order Register and Job Progress Report (WORJPR) provides a unique self-contained document which can be used at every level of command. This single register provides the necessary production data to produce operational reports and returns. Furthermore, it combines at least four of the forms in the MMMS CFTO into one. The WORJPR is essentially a line summary of a single job (1020D) through the workshop. It follows the flow of the job through the Maint Bn from the acceptance of the job by the planner, the allocation of the job to the production platoon, the execution of the job by the platoon, and the return of the equipment through the Receipts and Issue (R&I) Section to the closure of the 1020D.

The key difference in this system is the involvement of the platoon commander in the workload planning process. MMMS does not consider the platoon commander, however, it is recognized in a field environment that the planner is often overcome by events he cannot control and much is left to the initiative of the platoons. This field MMMS therefore places the onus and responsibility for production planning and control on the shoulders of the platoon commander, which in our opinion is exactly where it should be.

REPAIR PARTS

Many heated discussions were held on the subject of repair parts support needed by the Maint Bn. The guiding principle among the Maint Bn staff developing this organization was that each functional coy needed to have its own integral repair parts organization under command. This posed some problems and controversy for the Logisticians who were worried about the turmoil and accountability aspects of creating special accounts for such short periods of time.

A few years ago, 2 Svc Bn Maint Coy created what is now commonly referred to as a second line SSS account which provided them with their own repair parts account and organization which could easily be split into an FRG element and an MRG element. After several discussions with the current Svc Bn COs and the FMC Supply staff, the CO of the Maint Bn directed that 1 and 5 Svc Bns would, by 1 Apr 89, develop and scale a second line SSS repair parts account similar to that held in 2 Svc Bn. These accounts are to be capable of supporting the full range of equipments within the respective Bdes as well as being



NOTE 1: A cursery inspection only is done at the ECP to confirm diagnosis.
NOTE 2: Where the ECP dirs the workflow is dependent upon the tac and workload sit within the workshops. This decision will be made by the CO and appropriate dir given.

Fig 7: Workflow – Vehicle repair through the ECP

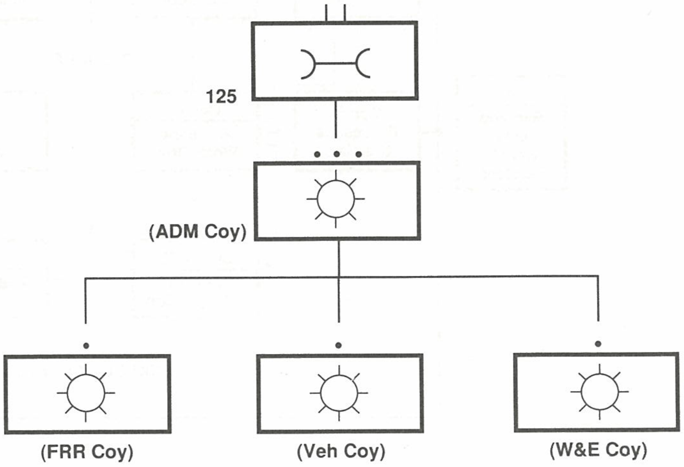


Figure 8: Repair Parts Platoon

split into an FRG and MRG component without affecting the account structure itself.

The Maint Bn repair parts organization will consist of a platoon HQ reporting to the Bn HQ and three detachments each representing the SSS accounts mentioned above. Each of these detachments (accounts) will be under command of its parent functional Coy HQ. Unlike the DISGP doctrinal concept, each of these three detachments will carry a composite array of repair parts. The 5 Svc Bn account will deploy with W&E Coy, 2 Svc Bn account with Veh Coy and 1 Svc Bn account with FRR Coy as is illustrated in Figure 8.

The RPPL HQ will effect technical control and monitor all three accounts. Demands will, in the first instance, be satisfied by the respective functional Coy's account. If this is not possible the central control cell (RPPL HQ) will have visibility of the other two SSS Accounts, and if possible will issue from these (for non routine demands only). A key function of this RPPL HQ control cell will be to balance the issues from the respectives SSS accounts to ensure equal usage of accounts is maintained. Should the part not be available from any of the SSS accounts, the RPPL HQ will place a demand on the Sup Bn Repair Parts Coy/P1 which holds the respective MSUAs. An IOR cell in RPPL HQ will coordinate all the IOR requests from the functional Coys.

What has not been discussed yet is what do the BSUs have for repair parts support? You will recall that each of these accounts was to be formed such that they could be split into an MRG and FRG element to facilitate deployment of Forward Logistic Groups (FLGs) during Bde exercises. Each account, therefore, can be split in two without changing the account structure. Since the BSUs only do in-situ repairs, the FRG portion of the 5 Svc Bn Maint Coy account can therefore deploy with 5 BSU in support of 5 GBC. The FRG portion of the 2 Svc Bn Maint Coy account will deploy with and be under command of 1 BSU in support of 1 CBG while the MRG portion of this account will remain with Veh Cy (2 Svc Bn Maint Coy HQ) of 125 Maint Bn. 1 Svc Bn Maint Coy forms the nucleus of the FRR Coy and due to the nature of its role and tasks, both the FRG and MRG portions of their account will remain with the FRR Coy.

The replenishment and accountability of each of these accounts is explained in 125 Maint Bn SOPs. It may sound complicated but in reality it is quite simple and practical.

SENIOR APPOINTMENT SLATE

The senior appointment slate for the 125 Maint Bn is as follows:

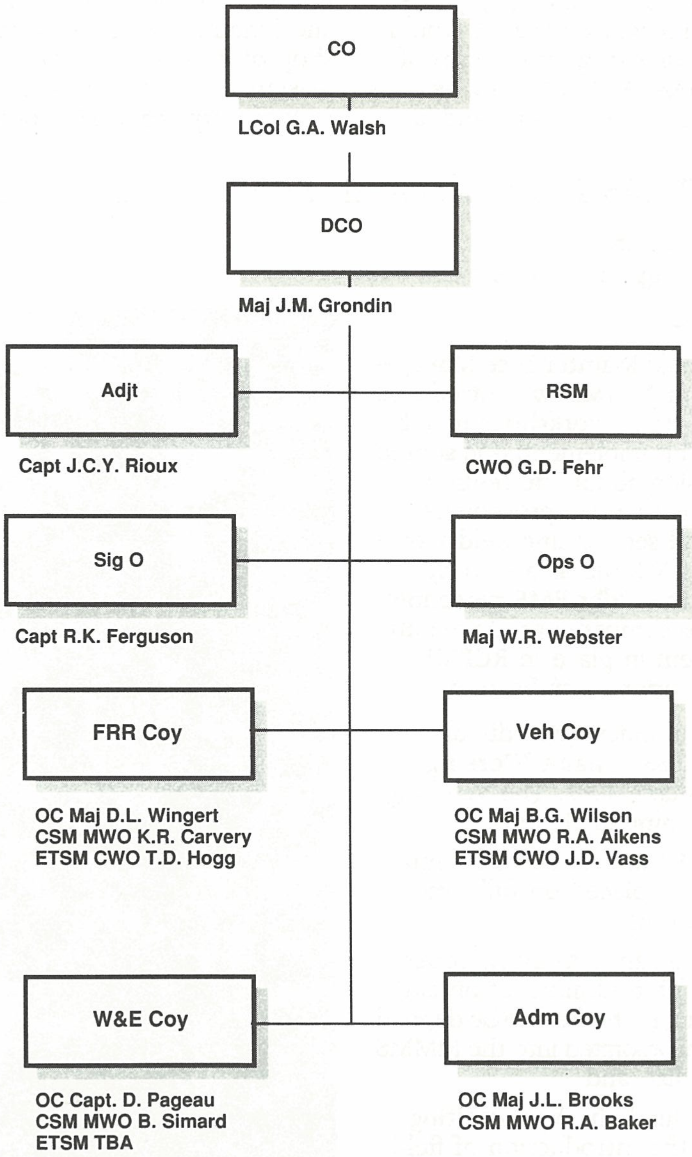


Fig 9. Key appointments

CONCLUSION

In this article I have attempted to show the logic and rationale used in translating some very general doctrine into specific instructions and organizations capable of providing the best possible second line maintenance support to the FMC Div. A great deal of hard work and effort has gone into this project. The key contributors in developig the concepts, operating procedures, line-by-line structural and organizational requirements, etc were Maj Pat Read, Maj Marc Grondin, and Maj Doug Wingert.

The concept of establishing a Maint Bn with functional Maint Coys in support of an RV has never been done before, and poses some very unique and challenging problems. It is recognized that it would be much easier to go with a Bn of three composite Maint Coys, as exist in the Svc Bns, commanded by a Svc Bn HQ. It is my opinion that this would accomplish little and prove nothing in terms of command and control of maintenance resources at Div level, controlling and loading a field deployed workshop of Bn size, and confirming the feasibility, effectiveness and accuracy of Corps 86 LEME doctrine. I am convinced the functional 125 Maint Bn will provide first rate maintenance support to the FMC Div in keeping with our well respected EME tradition.

Arte et Marte

Field MMMS Introduction in FMC

by Maj B. Cantin,
SO2 Maint Eqpt at FMC HQ

Background

The Manual Maintenance Management System (MMMS) was introduced in all EME static workshops in 1985 and 1986. This implementation started the discussion about the requirements to standardize procedures in the first and second line field workshops using MMMS as a starting point. For the older EME personnel, MMMS was compared to the maintenance system in place in RCEME workshops prior to unification.

This requirement was discussed at the FMC SSO Maint Working Group in March 1987. The Working Group recommend that :

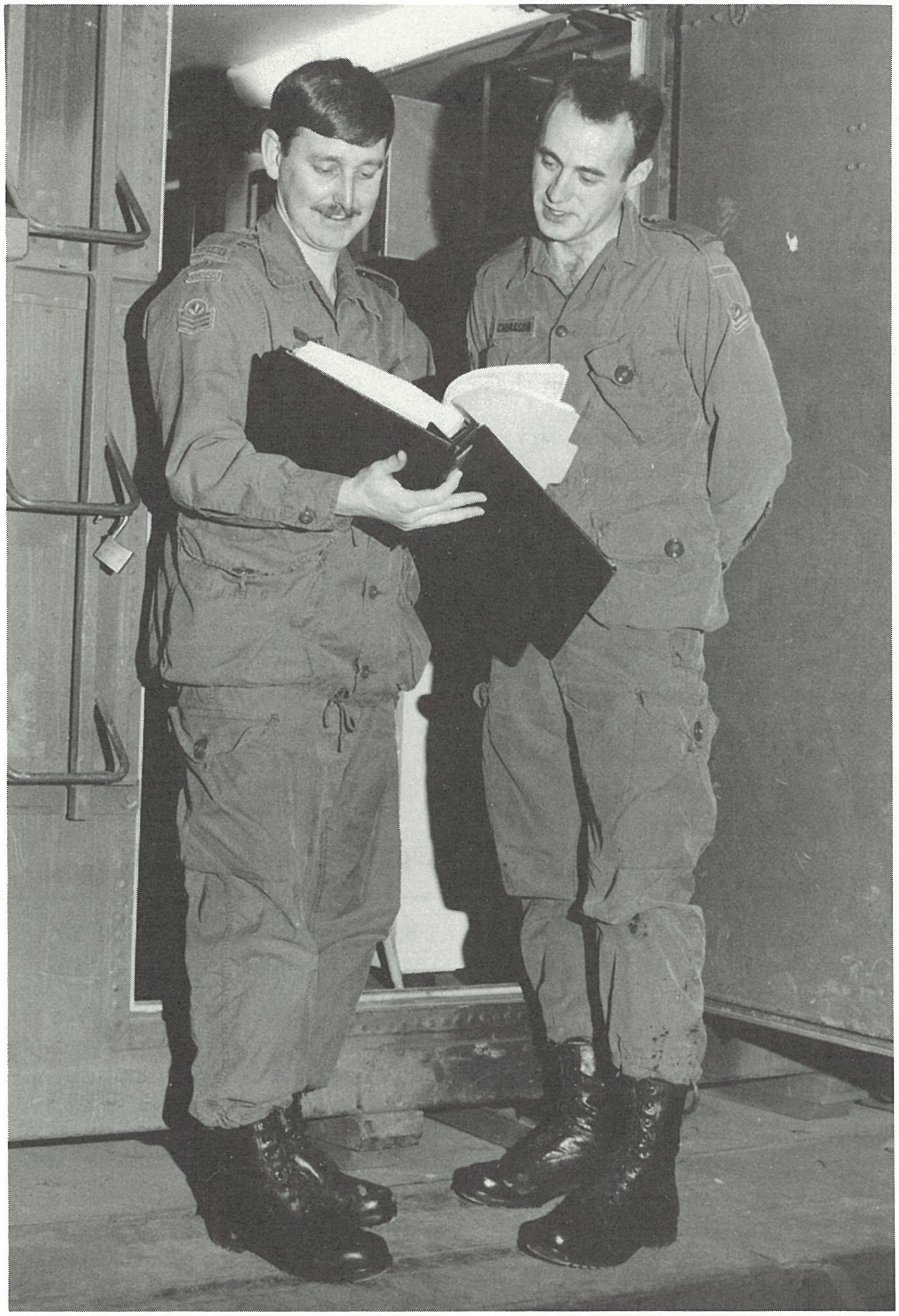
a. all FMC maintenance organizations be placed on full time accounting;

b. Maintemance Activity Codes (MAC) for administration and training in the field to be defined and incorporated into the MMMS MAC list; and

c. procedural changes resulting from the introduction of field MMMS be incorporated in the present CFTO. A standard format of reporting procedures was to be developed for both base and field organizations.

Based on the result of the Field MMMS trial carried out in Maint Coy 5 Bn S du C during 1987 to this date, DLES has revised the MAC list to accept field time accounting realities. It was then decided to place all EME maintenance workshops on full time accounting. This was effective as of 01 Feb 1989 in FMC workshops.

Maint Coy 5 Bn S du C has developed and trialed the second line Field MMMS procedures in 1987 and 1988. The time accounting portion was



Are we discussing about MMMS? Sgt Villeneuve and MCpl Chiasson from 5 Bn S du C Valcartier are certainly searching for an answer.

even started earlier since it was in place during exercise BRAVE LION in Norway. Maj Grondin submitted his report in spring 1988. After some minor modifications were made to the procedures, a draft second line procedures was distributed and the item was put on the agenda for the 1989 FMC SSO Maint Working Group. A version of these procedures will be used by Maint Bn during the RV 89 exercise in Wainwright. The second line procedures will be implemented in large static workshops and field workshops effective 01 Aug 1989.

First line procedures were revised by SO2 Maint Tech Sp, Maj Bob Tramer. A draft was distributed in Jan 89 and also put as an agenda item at the FMC SSO Maint Working Group. These procedures will be revised during RV 89 and will be implemented in the Fall of 1989.

What is Field MMMS?

Field MMMS is a standardized Manual Maintenance Management System that can be used by field and static first and second line workshops. It includes time accounting, second and first line workflow procedures, workshop management reports and maintenance and supply interface procedures.

Why Field MMMS?

You will most likely wonder about why we need field MMMS!

Well at the *unit level*, you find large first line workshops that are commanded by captains and other workshops that are commanded by MWOs, Sgts and MCpls. In second line workshops we find commanders and supervisors at section/platoon and workshop level. There is a need to *standardize* our procedures so that our personnel minimize the time required to learn the procedures used in their new job. The same remark applies to the craftman. Maintenance leaders at all levels *must have the proper information* to make decisions and control the resources under their command since they are *accountable* for them. The resources include: personnel, tools, fund, parts and facilities to name a few. When procedures are standard it is *easier for the equipment user* to go to the right place to get the proper service and answers to his queries.

As we are procuring more equipment, we do not necessarily get more people to maintain it. This fact is well proven by the current double hatting situations in the Svc Bns. With the event of ARMY 2002, this reality may impact on our workload even more. This forces us to do *things right* so our craftmen is not burden by overtime. The only way to do this properly is to organize ourselves. Field MMMS assists us in doing just that. The time expended on equipment that will be reported during field operations will assist our Project Management staff to better assess the number of craftmen required to maintain the equipment they want to procure. CFSEME will be able to train our personnel on workshop procedures that are standard throughout the EME system, thus minimizing the learning curve of personnel posted to the workshops.

MMMS vs Field MMMS

Procedures used in the field have been incorporated with those in static bases when possible. The main differences between the revised procedures and the old MMMS are summarized below.

The addition of the principles of survivability and accountability mean that we must survive on the battlefield in other to do our work and that whoever has resources assigned to him is responsible for the proper use of these resources.

A large workshop is defined as a workshop where a command level (Platoon) exists between the workshop commander and the section supervisor. This will allow the procedures not to bypass the chain of command.

The planning function is partially delegated to pl level so the chain of command is respected.

The in and out inspector will report to one level higher than the immediate supervisor of the craftman doing the work to be inspected. This again to respect the chain of command.

The ECP is treated as an extension of the R&I clerk with casualty classification confirmatory inspection responsibilities. This is to minimize the time the vehicle casualty must stay at the ECP and not duplicate the inspection that will be carried at pl level.

Conclusion

The introduction of Field MMMS in all EME workshops will benefit everyone in the Land Maintenance System. It assists us in preparing ourselves for the future by giving us the right information to make decisions. Also, Field MMMS provides us with the procedures that enable us to enhance our capability to perform the right work in an effective way.

ARTE ET MARTE!

CFTS Update

Maintenance Management

by Major D.B. Parker
SO Maint, CFTSHQ

There is not one person outside the LEME Branch who would not argue that the way we do business in LEME should be the same whether it is in Esquimalt, Borden or the smallest station in the CF. The magnitude of the problems might be different between locations, however the way we do things should be the same. Every Branch in the CF has recognized this fact and have systems in place to cater to everyone's needs. The pay system is a prime example; as customers of that system we rely on it to provide us a service and do not have to relearn how to get our pay each time we are posted.

Why is it then the way we do business different in every Base. In one Base, 20 years after integration the Airforce system of major and minor inspections is still in place.

Why are Tels Shop in CFTS the only Shops using MMMS procedures to the letter. Why does it appear the system in being at a Base Maintenance Section is based on the one personality which takes the strongest interest – at one base it was a female Lt who ran the whole show, at another it was a CWO, at another it was the R & I clerk. Could it be we assume too much; or could it be we assume that everyone knows the Land Maintenance System (LMS) and we assume they know what is expected. The answer to that question can be found if we start by looking at the services provided by LMS.

We know the LMS provides LCMMs with all kinds of data. The OSMER process is fine tuned with all kinds of data produced by the LMS and there are several volumes of works published explaining the process. As for the service LMS provides a B Maint Sec there is a virtual pile of data. If I wanted to read up on what this pile represented and how it could aid me, I'd start at the top with the policy deliniated in the 314 series. Of course I'd read the MMMS manual, however, I'd consider that document not a true management aid as it primarily centers on explaining the clerical functions of how LEME does its business. Where could I find a document which will help me manage within a "system" so that I can have the confidence in my actions reflect what is expected by the system"? What documents are there which ensure the "system" at my B Maint Sec is the same at the next B Maint Sec? The search revealed there are none. Nothing exists between the policy and the clerical functions. It is therefore not surprising the void has been filled with a lot of peoples' best intentions and tied together by a lot of assumptions.

Based on this observation it was decided to hold a conference in CFTSHQ to try and identify what is needed to fill this void. Representatives from all CFTS bases and all commands were present for a month's worth of ideas forced into a three day conference.

The conference started with the agreement the major component of the LMS involves leadership and there was no attempt to change that fact. As you cannot provide leadership to a "system" it was agreed the success of the LMS has to be based on a balance of leadership and management. Let me expand that idea further. With every management job there is an element of routine and an element of problem solving. At the lower management levels there is more routine than problem solving and vice versa at the upper management levels. It is the "routine" which formed the scope of the conference, and it is the "routine" which represents the management related to the "system". It is interesting to note that should the routines diminish every situation starts to become a problem leading to what is most often called "crisis management". Therefore making it imperative to maintain the balance between establishing routines and having the time to problem solve; balancing as I said management and leadership. It is also interesting to note that if the routine procedures are not periodically reviewed for appropriateness, this side of the balance can become infested with bureaucratic procedure which undoubtedly can undermine the collective efforts of everyone.

The process of developing an aid could not proceed without a plan of attack. It was therefore decided to:

a. Identify the assumptions;
b. Expand into the area of efficiency and effectiveness;
c. Identify goals and expectations;
d. Identify all the sources of information needed to manage; and

EFFECTIVE
GOALS AND EXPECTATIONS
SHOP SUPERVISOR LEVEL

GOALS	**EXPECTATIONS**
100 % Equipment Inspections	**(i) All equipment inspections are to be completed on schedule as required by CFTOs or Manufacturer's Specifications.**
	(ii) The supervisor applies himself in support of the EME system.
	(iii) The supervisor must know the Administrative parameters/workload of his subordinates.

EFFECTIVENESS
GOALS AND EXPECTATIONS B MAINT O LEVEL

GOALS	**EXPECTATIONS**
Ensure operational fitness and timely availability of all user equipment.	**Establish an overall administrative means of monitoring effectiveness which contains the following elements.**
	INSPECTIONS
	(i) Maintaining meaningful inspection objectives
	(ii) Monitor equipment inspection schedules for strategy adjustments
	(iii) Monitoring ATI schedules and results for strategy adjustments and for advice to unit COs on matters affecting operational fitness.

e. Provide a guide detailing the purpose of each system document.

First the assumptions. These are really motherhood statements which could have been expanded ad infinitum. In the final aide-memoires this list of assumptions was renamed to tenets for a Base Maintenance Section.

a. The customer is the reason for our existence, that is to say, we are here to provide a service to the customer.
b. Target date awareness is not just a Control Officer function.
c. Everyone must be aware of their own function within a B Maint Section as well as a detailed knowledge of their subordinate functions.
d. Subordinates must understand the purpose, operational use and technology of the equipment they maintain.
e. Tasks must be fully understood at all levels.
f. There is only one EME maintenance management system for the CF.
g. Working as a team involves the timely passage of information.
h. All levels in an organization cannot function effectively without timely and accurate information.
j. Safety and security is everybody's business.
k. Expectations must be stated not assumed.
m. To escalate a problem requires concern over feedback (Don't pass on and forget).
n. Balance the historical, present day and future implications in preparation of plans.
p. Order all the right parts the first time.
q. Fot Intermediate Level supervisors to manage the routine of their subordinate Repair Shops is to not do his/her job.
r. Accountability cannot be delegated.

The 314 series, 314(1) to be exact, made brief reference to effectiveness and efficiency measurement. These are defined accordingly.

a. Effectiveness measurement — To monitor the level of service provided.
b. Efficiency measurement — To monitor how well resources are being used.

Let's first look at effectiveness since that really impacts on our aim in life. Obviously effectiveness cannot be viewed with the same parameter throughout the various levels at a B Maint Sec. The shop supervisor level needs more detailed direction than the B Maint O therefore effectiveness measurement was broken out accordingly in the following examples.

In developing efficiency measurement parameter the same logic was used with the following example results.

In preparation for the conference the list of forms and printouts used solely within the LMS reached over 80. Some were duplicate of others and some we were not sure what purpose they had. The list was peeled down to 46 and produced into a MATRIX showing who used, inputed, examined and monitors all the LMS forms and printouts.

The final aspect of the conference dealt with finding the purpose behind each form and printout. Who uses what and why? Some were obvious but others had uses not immediately apparent to the unfamiliar. The purpose of the summary of inspection CF 1184 form, for example, is not to have one for each trade for each unit, for each year; but how often are the CF 1184's PA'ed automatically after completion.

EFFICIENCY
GOALS AND EXPECTATIONS
SHOP SUPERVISOR LEVEL

GOALS	EXPECTATIONS
Use minimum resources and provide required level of support	**Monitor work output of tradesmen (Gainful employment)** **Identify and implement labour saving techniques and or devices** **Work output meets or exceeds national average/SRT**

EFFICIENCY
GOALS AND EXPECTATIONS
B MAINT O LEVEL

GOALS	EXPECTATIONS
Make the most efficient use of available resources.	**To be held accountable for the functioning of B Maint Sec.** **Establish an overall administrative means for monitoring efficiency.** **Gathered historical data on manpower utilization must equate to posted-in strength.** **Shortfalls identified above must be identified as ''work not done'' leading to corrective action via normal options available, ie. mandays, contracts, etc.,**

The end result from the conference was a mass of data which aided in developing a series of aide-memoires listed accordingly.

a. Introduction to Maintenance Management (CFTO C-04-025-000/AG-H00;

b. Shop Supervisor — CFTO C-04-025-000/AG-H01;

c. Intermediate Supervisor — CFTO C-04-025-000/AG-H02;

d. Production Officer — CFTO C-04-025-000/AG-H03;

e. Control Officer — CFTO C-04-025-000/AG-H04;

f. Workshop Support Officer — CFTO-C-04-025-000/AG-H05;

g. Base Maintenance Officer — CFTO C-04-025-000/AG-H06; and

h. Base Technical Services Officer — CFTO C-04-025-000/AG-H07.

Scaling in Static Operations

by Major D.B. Parker
SO Maint CFTSHQ

History has shown time and time again how battles have been lost for the sake of the proverbial 'horse shoe'. The Airborne forces during Operation Market Garden in WW II, for example, were severely hampered at the onset by lack of available spares. In peacetime, our EME history has also shown our reputation as good maintainers is directly related to repair parts availability. The bottom line response wanted from customer units is "when will I get my equipment back?" But how many times a day do you hear someone say "it's been ordered through supply, it's not my problem anymore." There may be bonafide reasons for the lack of a 'horse shoe', however it is our reputation that suffers in the eyes of our customers simply because the lack of available spares caused an equipment not to be ready when expected.

Given unlimited space, money and manpower we could stock every identifiable part for every equipment maintained. Unfortunately this is not possible, therefore a conscious effort must be made to identify in reasonable terms, the type and quantity of repair parts required for a given number of equipments over a specified time period. This activity, as we well know, has traditionally been called scaling. And for some maintainers it is a very emotional issue; from those who are convinced it is a waste of time, to those who consider it to be a lost art, begging to be brought into the modern era of computers.

Irrespective of your emotional position on the matter, there may only be a limited number of workshops actually employing scallers in a full time role, however, every workshop does scale even though they are not consciously performing it as a scaling function. Anyone who has ordered one item for the repair at hand and at the same time included another one or more for the shelf in his shop has, by definition, performed a scaling function. Anyone who has complained about the availability of the range of bolt sizes required to do a job has also done a scaling function Any person therefore, who has taken action to ensure future availability of repair parts is guilty of performing a scaling function.

Prior to integration, scaling was seen as a vital function to the efficient operation of a RCEME Workshop. Since that time, scaling has not been taught as a maintenance management tool at any of the formal courses conducted at the CFSAOE or new CFSEME. Left to individual interpretation, scaling has taken many forms over the years and is probably done differently at each workshop. A most interesting variation was conducted at 202 WD. Up until the early '80, the scaling function for overhaul performed at 202 WD was not performed in a traditional sense. Each parts procurement transaction which delayed the M113 rebuild line, was automatically put on a master list and treated with heightened concern for future rebuilds. The parts on this list hardly ever caused future problems for each new rebuild, however delays kept occurring due to other parts procurement problems — it was "never the same part twice."

Since it is not envisaged man will create the perfect machine in the foreseeable future, it is considered important to continue to rely on an optimum availability of repair parts to meet operational needs; consequently in one way or another scaling must continue.

In order to start at a base line for discussion purposes, a common interpretation of the types of repair parts was established.

a. **Class I — Common parts required in support of workshop activities.** This class of parts includes the common items or nuts-and-bolts of the trade found in any workshop. These are the common stock items available to technicians in lazy susans, bins and/or tool crib. They are non-accountable items to the CFSS once issued and not costed to the repair job by WMS. It is the responsibility of the BMaint Sect to identify the type and quantity required and BSup Sect to maintain adequate 30 day stock levels on a continuing basis.

b. **Class II — Expendables.** These items are also non-accountable to the CFSS once issued and not costed against the repair job by WMS. They are all the low cost, high usage specialty repair parts ordered on CF 1020's Expendable Work Orders and stocked in the appropriate repair shop for immediate use during repair.

c. **Class III — First line Repair Parts.** There are three types of repair parts that fall under Class III:

   (1) **Type I** — Parts requirements known before inspections are performed. This includes such repair parts as plugs, filters, oil, points, etc. These are the repair parts that are

automatically changed at specific intervals. For any given fleet of equipment an annual projection of repair parts can be established with virtually 100% certainty the repair parts will be issued.

(2) **Type II** — Parts requirements known after periodic inspections performed. These are the repair parts that are replaced at the end of their useful life, such as brake pads, tires, firing pins, etc. It is not possible to predict 100% certainty of usage in any given year, but extremely close.

(3) **Type III** — Parts required as a result of unscheduled failure. These parts include bulbs, belts, alternators, radiators, etc. The parts requirements will depend primarily on usage history data and therefore cannot be predicted with complete certainty they will be used in a given period.

d. **CLASS IV — Second/Third Line Repair Parts.** These parts include the repair parts used in support of second and third line maintenance repair activities. As with Class III Type III they are parts that are required as a result of unscheduled failure, therefore difficult to predict with any degree of certainty. These parts will not only be the truly second/third line parts such as engines and transmissions but will include the expected repair parts that will be required in order to install the engine and/or transmission.

Having established the class/types of repair parts which encompass the scaling function, the next step includes the development of statements outlining the corporate policy or position on scaling. This outline is developed for the purposes of aiding BMaintOs to develop their scaling strategy.

It first must be established what goals are expected to be attained from performing the scaling function. Why and for what purpose?

In researching the various Canadian Forces publications and technical orders on maintenance it was discovered there are various definitions applied to common technical terminology which can cause varied interpretations. Confusion currently exists for example, between the CFSS and EME world in regards to consumption points and bench stocks. It is therefore imperative to establish acceptable definitions for such words as scales, levels of stocks, initial provisioning, major assemblies, minor assemblies, topdown/breakdown, expendables, etc.

CFTOs on standard commercial vehicles clearly state repair parts requirements are to be addressed at the local level. There are no other references to be found stating the local scaling policy for other fleets required to be supported. Experience has shown local scaling has expanded to other areas therefore depending on the role of the Base the types of scales should be established to include such equipment as

- SMP fleets
- Non-vehicular equipments
- Repair parts for inspection teams
- Engineering equipments
- Milita unit scaling requirements on an annual basis
- Militia training scales for exercises and
- Consumption points/bench stocks in support of maintenance activities.

Local conditions dictate numerous factors that must be taken into consideration prior to the actual parts procurement action being taken. Some of the factors are:

- Equipment priority
- PRS/ELD/IP scales available
- Funds available
- Cost of repair parts
- Warehouse space available
- Impact on Base Supply Section
- DEWAO/Warranty
- Quantity of equipment in fleet
- Availability of repair parts from supplier
- Credibility of usage data available
- Failure Data/Supply System data available
- Knowledge of scaling in-house
- Other unit fill rates in the local area
- Cost of rental
- Introduction/disposal of new/old equipment in CF inventory.

The duties and responsibilities of the scaler must also be established. This should include such items as:

- Types of scales
- Research to be conducted
- Life cycle of events
- Liaison duties with NDHQ/Scalers in other bases/CFSS/and parts suppliers.

Scaling, like any other complicated technical procedure, can be structured in such a manner as to logically identify the sequence of events. This can be displayed in various forms, such as listing the activities to be performed by each participant in a tabular manner or by using flow charts.

Before any scaling can be done, the format of the scale has to be agreed upon. Should the NDHQ standard format be suitable for local scales it should be stated. If not, the local format should be developed to meet local conditions.

Nothing receives more negative acceptance than an idea ill-conceived in the planning stage. All new scales must therefore be staffed accordingly:

	To
— statement of requirement	B Maint O & B Sup O
— initial validation	B Maint O & B Sup O
— final approval	B Maint O & B Sup O

MARCOM Update

MARCOM EME Working Group 1989

By Capt L. Moulton

THE CONFERENCE

Representatives from all Maritime Command Bases and Stations assembled in Halifax for the annual Working Group from 13-15 February 1989. Feeling like orphans stranded on either side of the country, we decided that it was necessary for a brief moment to turn our attention away from support to the ships and instead turn our attention inland to the changes and developments occurring in the Directorates within DGLEM and in major Crown Projects.

In an attempt to not only learn about the new equipments being brought on line, but also to develop an understanding of the complexities involved in the acquisition of these equipments half of the conference was devoted to Project managers. Thus PM LLAD, PMO MOST, and PMO TCCCS were invited to address the Working Group. Maritime Command was also pleased to welcome BGen Hanson, Col Svab and CWO Roy as well as representatives from DLES, DSVEM and DCMEM to the Working Group.

All delegates to the conference left Halifax with a greater understanding of the work being done in Ottawa and of the challenges that they will be facing in the 1990's.

BIRTHDAY CELEBRATIONS

Background. As expected, there was much talk of the 50th Anniversary celebrations during the Maritime Command Working Group. Knowing that EME personnel are always looking for a reason to party, the staff at MARCOM HQ set out to find one. It wasn't necessary to look too long before they discovered that BGen Hanson had the audacity to be celebrating his birthday while on his trip to foggy Halifax.

The Plan. Plans were quickly formulated for what was to be a top secret and a high risk mission. Only three things were required: the time, a place and of course the birthday cake. The first two were easy, but the third posed a bit of a problem. Cakes large enough to hold the required number of candles are not easy to come by, so the assistance of the Command Chief Cook was enlisted. The staff only had one humble request, that the cake be decorated to reflect the branch. Undaunted CP01 Maddison accepted the challenge. The product that emerged from the kitchen at the Chiefs and Petty Officers' Mess was first rate. Bravo Zulu to the Cooks.

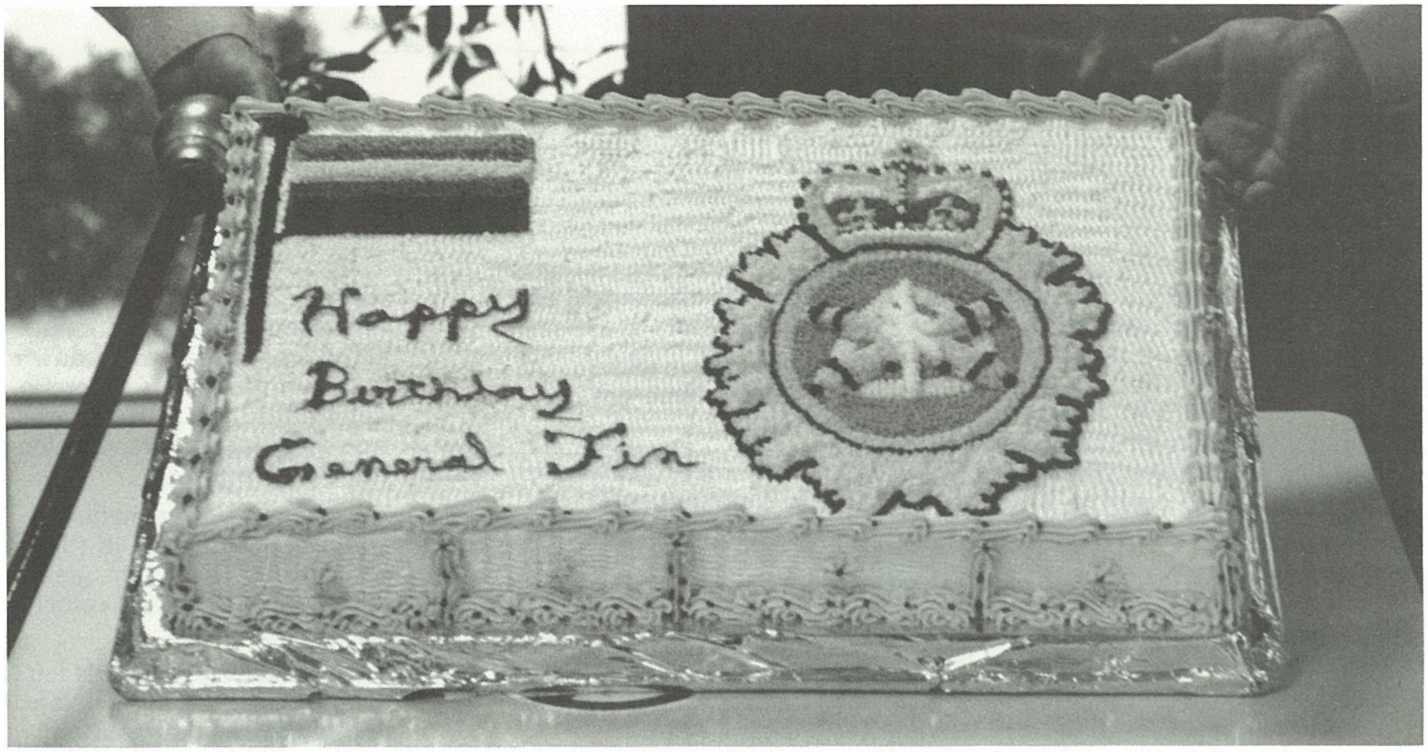
The Execution. Discretion being the better part of valour, the staff decided to serve the cake as it was and not put a towering inferno of candles on top.

I have it on good authority that nothing was leaked to the Working Group attendees nor to the General and all delegates were extremely pleased to help him celebrate his birthday and to have a reason to continue the party that night.

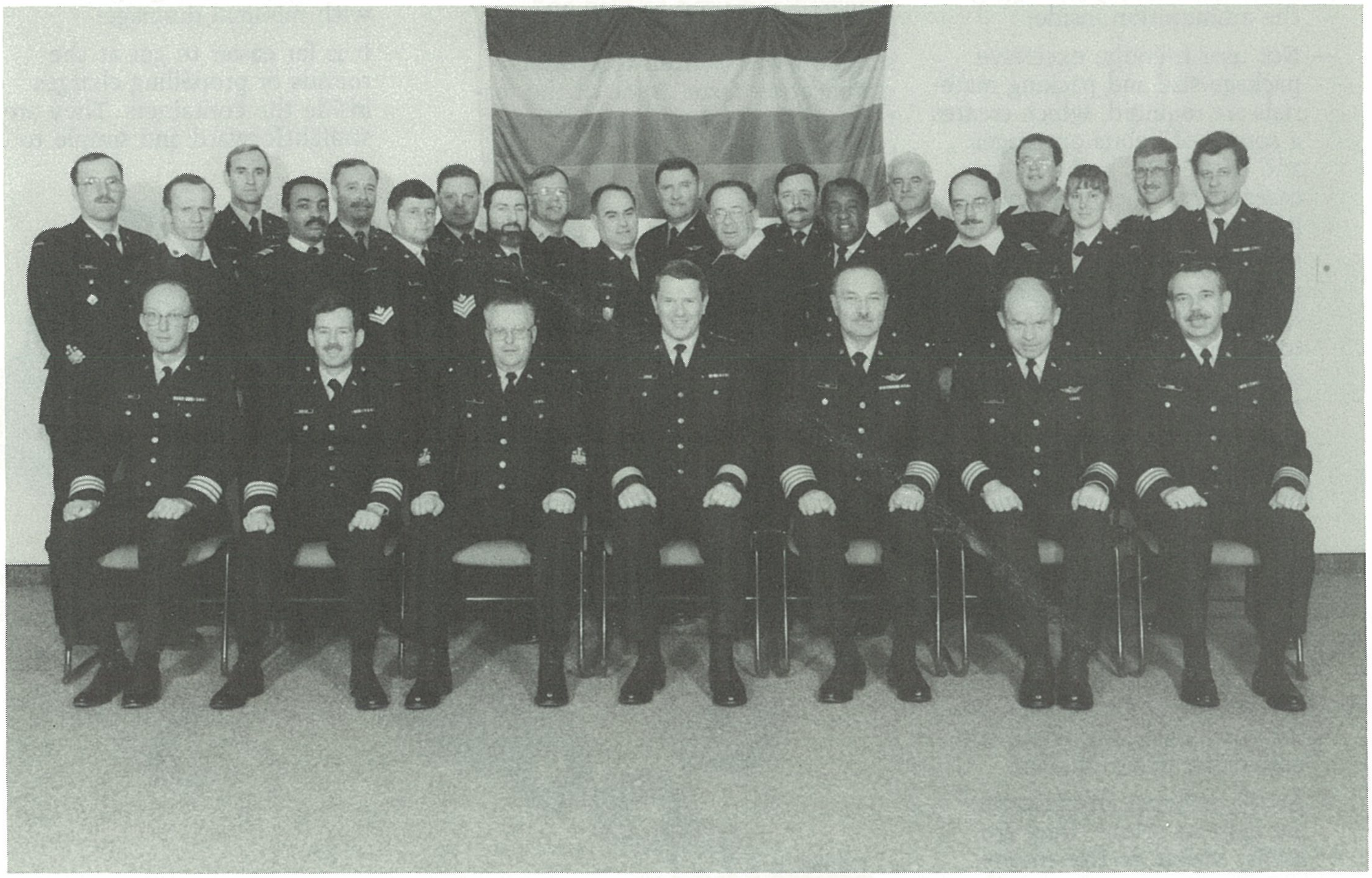
Postcript. The staff's planning and execution of the operation was so well done that no one knows what day the cake should have been served or how many candles were required.

HAPPY BIRTHDAY, SIR from all of the personnel in Maritime Command.

BGen J.I. Hanson DGLEM cuts his birthday cake while Maj J.G. Reade SSO EME MARCOM Headquarters looks on.



"Happy Birthday General Jim," from all of the personnel in Maritime Command.



Front Row (L to R): LCol Britt, LCol Morrison, CWO Roy, BGen Hanson, Col Svab, LCol Clarke, LCol Lydon
Back Row (L to R): CWO Nicholos, Sgt Brousseau, Maj Reade (SSO EME), Maj Redmon, MWO Davies, MCpl Gaudet, WO McCormack, Sgt Papillon, CWO Jennings, Capt McLelland, MWO Dickie, WO Donnelly, Maj Low, Capt Grant, MWO Faulkner, Maj Walsh, Capt Vassbotn, Capt Moulton (SO EME), Capt Barteaux, CWO Colburn (EME 2)

Missing: Col Brewar, LCol Lindsay, Maj Ross, Maj MacDonald **OR** *Delegates to the MARCOM EME Working Group 1989*

DAME

Container Ammunition Plastic

Many countries and companies have invested enormous amounts of money and efforts over the years to introduce improved ammunition. Unfortunately, there has not been the same effort put into making a user friendly system for the protection of this ammunition throughout its life cycle, which could be 25 or more years.

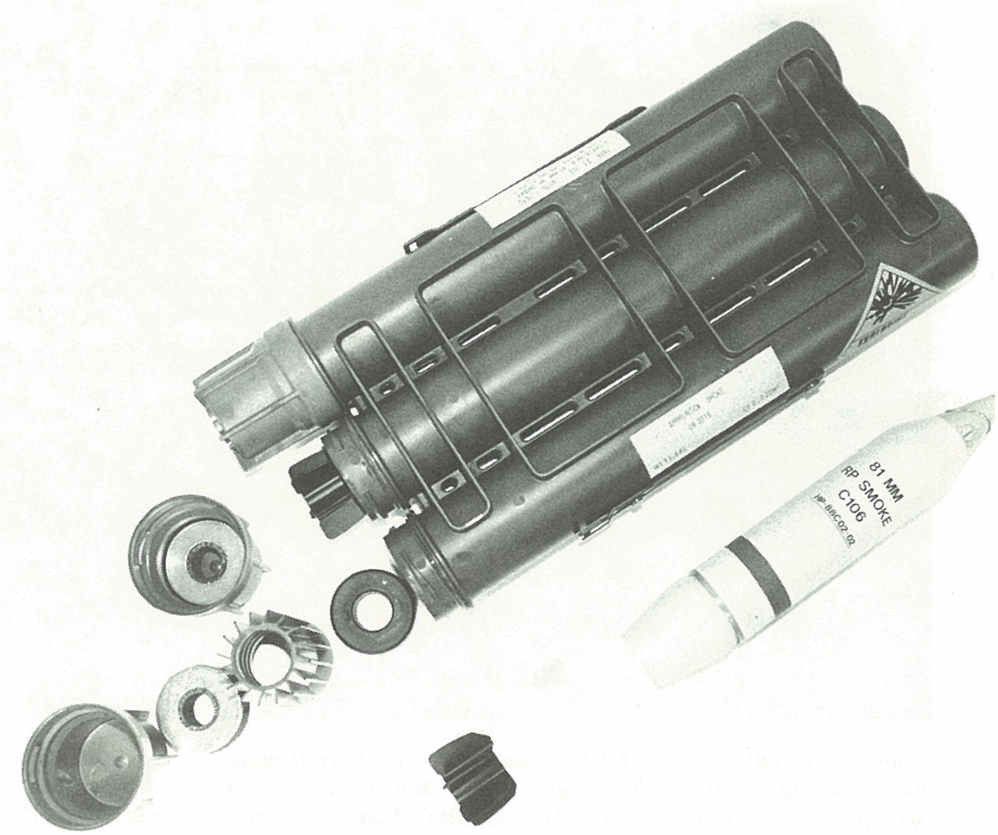
A review of the main characteristics of the older packages has produced the following list of deficiencies:

- Minimal environmental protection for the ammunition; packaging often leaks or absorbs moisture, thereby damaging the ammunition inside;
- Not user friendly; excessive package size and packing materials are required, which creates a source of debris on ranges and battlefield, and in some cases makes the ammunition hard to remove;
- Unpackaged rounds cannot be easily reconditioned/repackaged for immediate return to inventory, unless more money is spent for packaging spares and materials;
- Even in long term storage packaging deteriorates, requiring maintenance and repacking, which results in higher life cycle costs;
- The containers or packaging are harder and often too heavy to handle by the soldier. They are also difficult to open in the winter or during very hot weather, especially when containers are made of steel;
- As the majority of packages are light in colour, they are highly visible to the enemy;
- They are vulnerable to damage by rough handling, whether wooden or steel containers;
- They do not palletize easily unless a lot of dunnage is used;
- They are extremely susceptible to NBCW contamination, especially wood; and
- The packaging is seldom reusable, therefore not cost-effective.

To overcome these deficiencies, the Director Ammunition Maintenance Engineering (DAME) as the Canadian Forces (CF) technical authority for most ammunition matters, initiated a concerted effort to develop new packaging that would be user friendly, cost effective and provide improved protection to the contents.

New container specifications were prepared and used to plan and design the new package, and a new standard was written to conduct qualification tests. Some of the features of these plastic ammunition containers are:

- They are waterproof and corrosion proof. Therefore, all containers can be decontaminated by washing them down on or off the pallets. There is not need to worry about moisture affecting the ammunition, fuzes or charges;
- They are very user friendly and can be produced in shades of white for the Arctic, green for the jungles, or sand coloured for the desert;
- There is almost no debris left over when the containers are unpacked. The ammunition can be quickly repackaged, in the event of redeployment, with minimal dunnage;
- It is far easier to get at the rounds or propelling charges inside the containers. They are straightforward and simple to



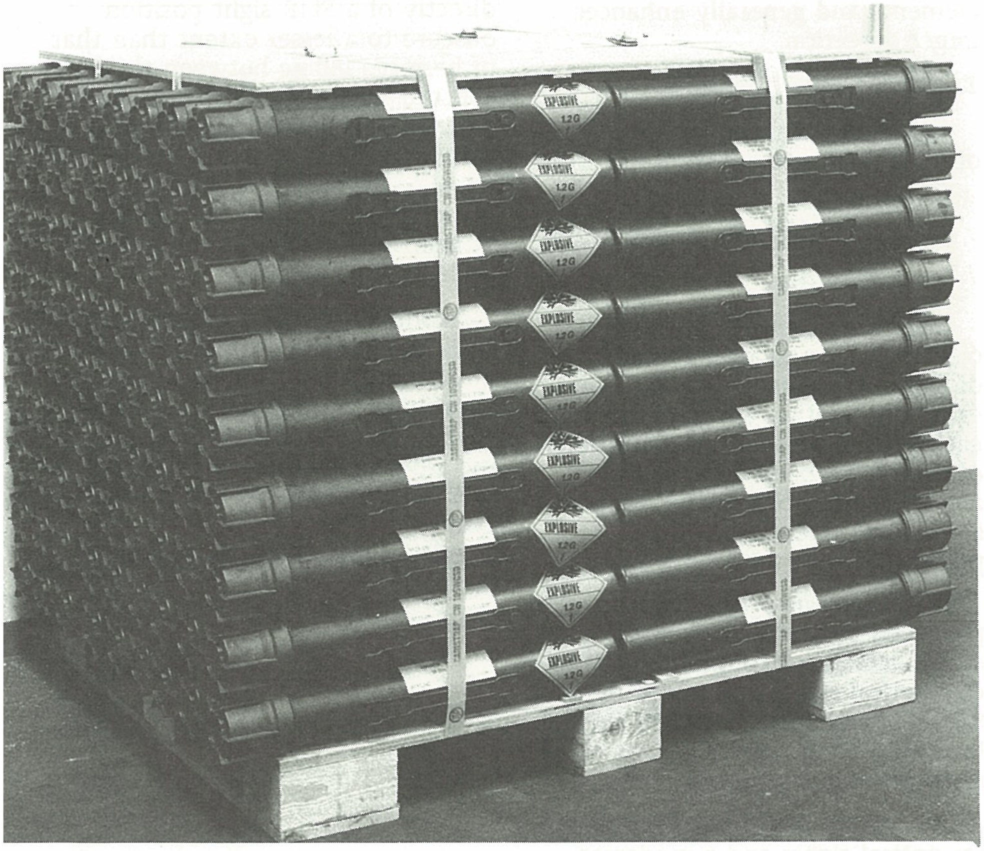
Container Ammunition Plastic C122 for 81 mm Mortar C106 RP Smoke open, with just a twist of the cap;

- They have a normal service life of up to 20 years;
- Fuzed ammunition is protected against any rough handling or dropping. They also protect fuzed ammunition against deterioration in long term storage;
- Since the containers interlock when stacked, pallet loads are secure and stable in shipment and pallet loads can be unit configured. Each container also has a positive, effective sealing system to prevent tampering;
- They are lighter in weight, and, if necessary, pallet loads can be broken down and the individual rounds can be easily man carried to the guns; and

They are recoverable and reusable and do not lose their long term storage capabilities, which makes them cost-effective.

Scepter, a wholly-owned Canadian plastics manufacturing and distribution company, well known for its fuel and water containers which are used by the CF and other NATO countries, has conducted the design and production work based on the above concepts.

As several types of ammunition to be packed in plastic ammunition containers use electric primers, there was concern about static electricity buildup. This problem was quickly eliminated by using special anti-static plastic compounds in the pull handles or by using the compounds in the material of the container bodies.



Container Ammunition Plastic C122 for 81 mm Mortar – Palletized

To date, plastic ammunition containers have been produced for the 60 and 81 millimeter (mm) mortar, 84 mm Carl Gustaf anti-tank gun, Naval 3 inch 50 and 3 inch 70 calibre, 105 mm tank and 155 mm howitzer. Work is now in progress to produce containers for the 57 mm and 76 mm/62 calibre Naval rounds, 76 mm armoured car round and the 120 mm mortar and tank rounds.

NON-METALLIC STRAPPING

For several years, metallic strapping has been used in the ammunition field to secure not only individual packages but palletized loads.

However, as with most systems, metallic strapping has its disadvantages. It cuts into the packaging during tensioning, has a tendency to stretch during transport resulting in a loose load, once broken it cannot be reattached and it is a safety hazard when cut due to the whip or spring back action of the loose ends.

In conjunction with the design and production of the new plastic ammunition containers, it was decided to pursue the availability of improved strapping that would overcome some or all of the disadvantages previously mentioned.

The end result is that *Caristrap*, another Canadian originated product is now being used. It is polyester corded strapping, utilizing a self locking buckle, which can be tensioned or readjusted as required without the use of tools. This will be particularly useful for the field in that the pallets may be broken down (straps loosened) for the time required and then restrapped prior to movement. One other important use of *Caristrap* is that in an emergency it can be used as a towline for your car.

DLAEEM

FLIR Sights

Forward Looking Infrared (FLIR) sights have become the electro-optics sight of choice in military applications throughout NATO. The Army is presently employing FLIR sights on the TOW anti-armour weapon system and will soon be fielding additional FLIR systems such as NODLR (Night Observation Device Long Range).

The aim of this article is to provide a better understanding of the capabilities and limitations of FLIR target acquisition devices and night observation devices.

FLIR systems enable trained operators to detect and identify targets at long range day and night. During clear daylight hours FLIR performance equals that of day optical sights. During adverse weather conditions and during periods of darkness FLIR systems far exceed day optical sight performance.

In sequence the article will discuss the effects of fog, snow and tactical obscurants such as white phosphorous smoke and attempt to provide easy references or benchmarks for comparison.

FOG

The severity of fog can be expressed in terms of unaided eye visability ranges. Light to moderate fog is characterized by a visual range of over one kilometer. This fog provides generally a good to moderate target acquisition environment and has little to no effect on FLIR capabilities. Heavy fog provides a visual range of less than one kilometer and generally imposes severe limitations on FLIR capabilities.

Dense fog tends to cool off both the target and background as well as block the transmission of target signature along the atmospheric path between the target and the FLIR device. In heavy fog motor and engine noises may be the only warning available to the gunner as targets tend to pop out of the fog at close range.

FLIR PERFORMANCE IN FOG

VISUAL RANGE	THERMAL SIGHT RANGE
500 m or less	500 m or less
600 - 1000 m	1½ - 2 times visual range
greater than 1000 m	full range performance

SNOW

When snow is falling or blowing it becomes as severe an obscurant as heavy fog. In general, falling snow reduces target acquisition ranges to about the visability range.

Fallen snow however, offers a unique background which assists target acquisition. The cold snow background usually allows the target to be presented in full outline as opposed to just signature elements and generally enhances target detection.

TACTICAL OBSCURANTS

Predominantly the tactical obscurants in use are

- diesel fog
- white phosphorus smoke (WP)
- artillery dust

Since the intensity of these obscurants is a tactical variable it is difficult to predict in advance the exact degradation which occurs from each type. However concentrations of each have been demonstrated and measured for relative comparison and an overview will be presented.

As an overview the diesel fog produced by the T62 on board generator acts as a strong obscurant to day optical sights and image itensifiers. FLIR systems however, penetrate diesel fog readily and its effect is almost inperceivable.

WP smoke is a strong obscurant for optical sights and a moderate obscurant for FLIR sights. In high concentration it is capable of defeating the TOW Night Sight. One of the unique features of WP smoke is the pyrotechnique effect generated from its intense heat, hence WP can obscure the field of view until most of the charge is dispersed. Multiple rounds of WP will prolong and intensify the obscurant effect. It is worth noting that when there is no wind WP smoke rises straight up and provides poor obscurance to FLIR systems. In this case the WP round must land directly between the target and the FLIR device.

Artillery Explosive Dust is a common battlefield phenomenom. The effect of dust and smoke from artillery impact is such that for day sights the wall of obscurant produced is almost impenetrable. Conversely, FLIR sights are disrupted primarilly in the immediate vicinity of the explosion, resulting in only temporary loss of contact with the target. Barrages falling near or directly of a FLIR sight position obscure to a lesser extent than that of barrages falling between the FLIR and the target. Artillery dust degradation is of shorter duration than that of WP. It has also been demonstrated that better FLIR performance is obtained in the presence of near field artillery impact rather than far field impacts.

In summary, the performance of FLIR night sights enable operators to gain tactical advantages in target acquisition and detection. A knowledge of how battlefield obscurants and adverse weather conditions affect FLIR systems will aid the commander and user in knowing what to expect from FLIR equipment in the battle.

Maj K.G. Horton
EME
NDHQ/DLAEEM

DSVEM Reports...

Since our last report in the summer 1985 issue of the EME Journal there have been a number of changes within DSVEM. Col Alex Gillis has replaced Col Butch Boucher as Director. The four functional sections within the Directorate are now headed as follows: DSVEM 2, Field Support Vehicles (SMP), LCol Peter Britt; DSVEM 3, Field Force Electrical Power, Mr. Steven Eng; DSVEM 4, Commercial Support Vehicles, Mr. Dennis Umrysh; and DSVEM 5, Special Equipment Vehicles, Mr. Dave Basu. Needless to say we have an excellent team in place and the arrival of new personnel to fill long existing vacancies now means that we will be better than ever able to cope with expanding technology.

The various portions of this report have been written by members of the sections concerned. There has been no attempt at censorship so the sections' contributions are diverse and should hold your attention.

DSVEM 2 — Field Support Vehicles

Members of DSVEM 2 have been hard at work to ensure the best possible availability of our fleets. Armstrong 500 motorcycles have replaced the old Can AM motorcycles, the Iltis has replaced the old M38A1 Cdn 2, 3 and M151 ¼ ton vehicles, the MLVM has replaced the old 2-½ ton trucks and the HLVW will shortly replace the old 5 ton gas vehicles. Qty 491 commercial utility cargo vehicles (CUCV) have been acquired for various roles in the Regular and Reserve forces. Brand new 1-½ ton trailers are now making their appearances and new ¼ ton trailers should appear starting in 1991.

The rosy picture outlined above is somewhat offset in that we will have to re-furbish the 5 ton diesel fleet once the HLVW is fielded. This refurbishment consisting of product improvements, modification update and body and mechanical repairs will be done under contract.

An engineering study has been carried out on the MLVW to assess corrosion. Replacement of fenders and paint touch-up will be required. Funds to have this carried out locally under contract will be provided.

Now for the bad news — the 1-¼ ton fleet will likely still be in service at least until 1993. This means that a second refurbishment will have to be carried out. An engineering survey of the condition of these vehicles has been completed and Mr. Charlie (ex-Capt) Vezina has been engaged to come up with a complete refurbishment plan. More news will follow.

Aside from some teething problems with the Iltis fleet, things are going smoothly in DSVEM 2. In order for us to keep providing an excellent service, UCRs and TFRs are required if we are to keep current and resolve problems. Please continue to keep us informed!

DSVEM 3 — Replacement of Herman-Nelson Space Heaters

Probably everyone who reads this article would have had some experience (good or bad) and received some warmth, from the venerable Herman-Nelson Heaters. Since their introduction in the Air Force in the early 1950's and later in the Land Force, these heaters have proven to be a rugged and versatile piece of equipment. Originally manufactured for heating aircraft, the fact that the heaters have been used by the Army for heating tentage is a credit to its unique design.

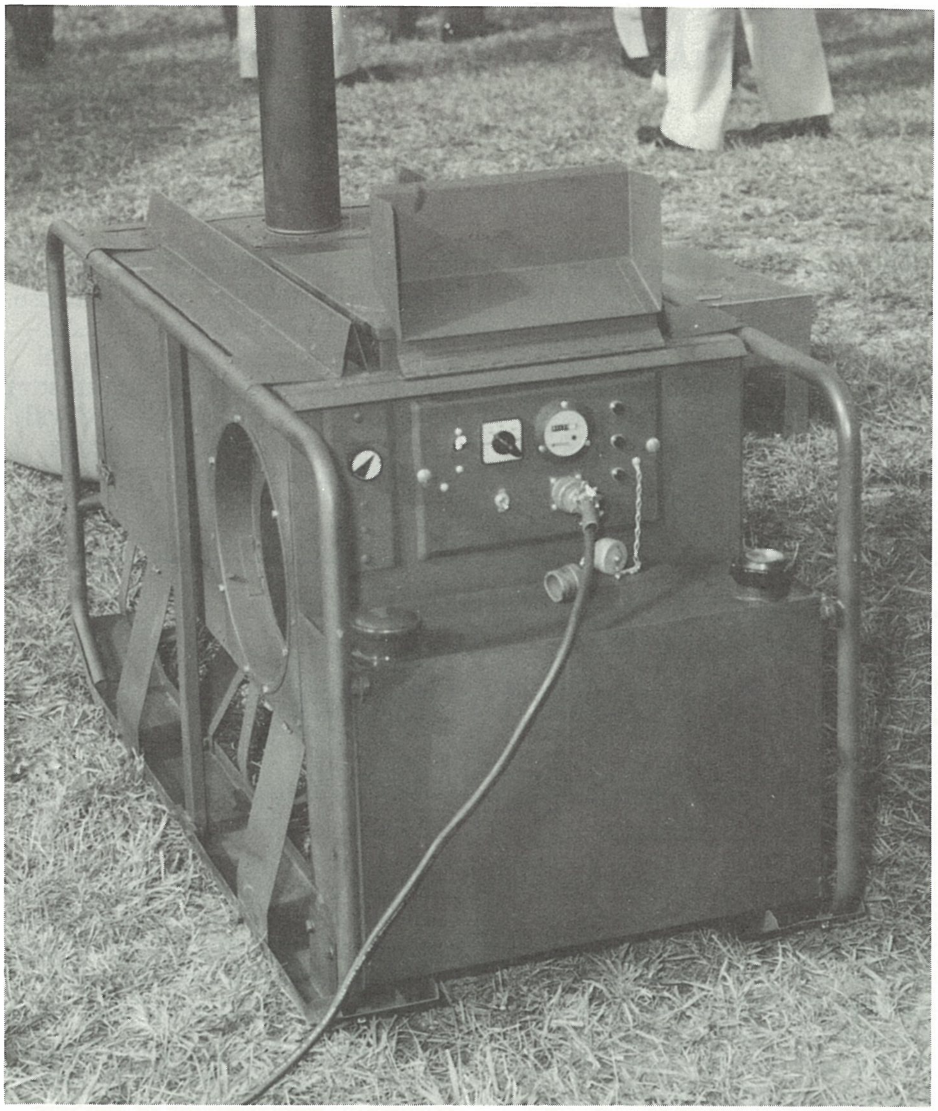
However, like all equipment 25 years old, the Herman-Nelson has reached the end of its time. Unlike an old soldier, this heater must be replaced due to limited spare parts and increasing difficulty in the rebuild at Genaire, St. Catharines which has become expensive and requires a long lead-time.

Recognizing the importance of the replacement, DSVEM 3 investigated several makes and models of space heaters available on the market. Cold weather trials took place in Ottawa and Petawawa with one model achieving the best results. The Vacan 80 Swedish Army heater with a capacity of 250,000 BTU/hr was thoroughly tested at LETE, NRC cold chamber and 1 FSH, Petawawa, with signs of being soldier-proof. The fact that the heaters were dropped off the back of vehicles with only slight damage to the shock absorbers, is a point in its favour.

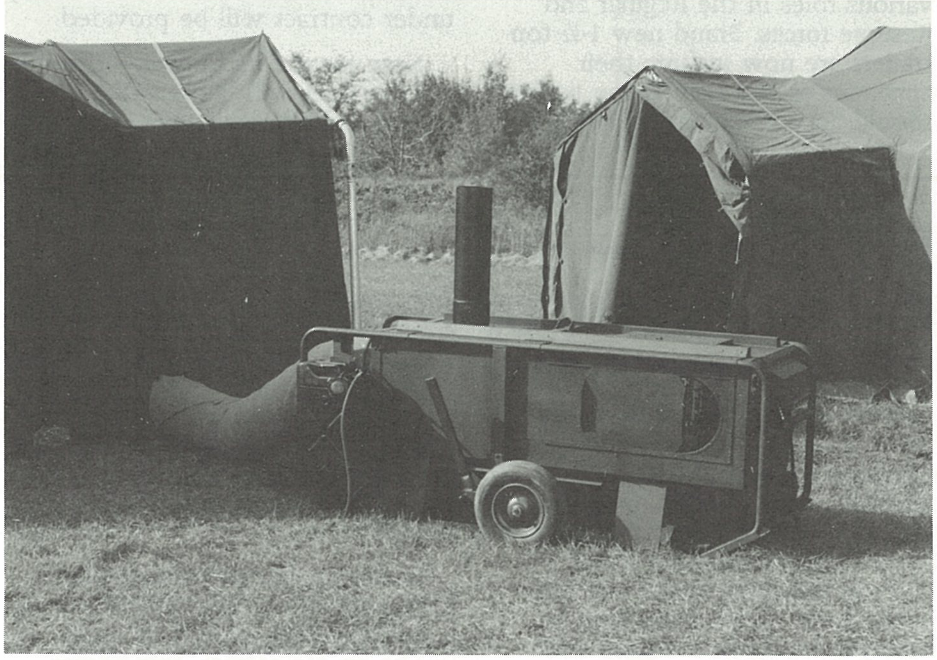
In December 1987, contracts were issued to Scanvent, Toronto to manufacture quantity 100 of the Vacan 250,000 BTU/hr heaters and quantity 200 of the Vacan 100,000 BTU/hr heaters. The combination of the two heaters will replace the Herman-Nelson (450,000 BTU/hr) depending on the size of the filed unit. Decisions were made to replace the Land Force Inventory with the first buy and the Air Force on succeeding buys. The first of the 100,000 BTU/hr will be available in CFE and RV 89. In addition, the Knipco 87,000 BTU/hr heater will remain with the field units.

Some characteristics of the new heaters — diesel fired burner, electric prime moving fan, tubular frame and true 100,000 and 250,000 BTU/hr heat output. Reliability and Maintainability were of prime importance during the pre-production and production stages.

In conclusion, the Herman-Nelson era has ended and the Vacan days have arrived. It is felt by all personnel who have been involved with the replacement project, that the Vacan space heaters will be part of the inventory for many years to come.



100,000 BTU/hr



250,000 BTU/hr

DSVEM 4 — Computerized Vehicle Simulation

The Directorate of Support Vehicles and Engineering Maintenance (DSVEM) is primarily responsible for providing LCMM support for the wheeled SMP vehicle fleet and the commercial vehicle fleet. One of the principal activities of this directorate is the continual replacement of commercial vehicles. Approximately 1500 vehicles are replaced each year at a cost of over $40 million.

To ensure that the replacement vehicles are capable of meeting the operational requirements, thorough engineering analysis is performed for each vehicle configuration before purchase. This analysis takes into account, desired user features, load capacity, road performance and cost effectiveness. One of the principal objectives is to ensure that the road performance is adequate for all driving conditions anticipated.

DSVEM uses the Society of Automotive Engineers' *Truck Ability Prediction Procedure* to predict vehicle performance. This procedure, approved in 1951 and revised in 1958, provides a practical method for the prediction of truck performance. Gradability, or the maximum grade a vehicle can climb at a given speed is the principal criterium for truck performance. It is a function of many factors — all of which must be accounted for in any performance prediction procedure.

The SAE procedure utilises several tables to determine these various factors. For thorough analysis this procedure becomes cumbersome and labour intensive. To reduce the time and effort required to apply the SAE procedure DSVEM developed a user friendly, menu driven, DBASE III application.

The data contained in the 9 SAE tables has been incorporated into the program eliminating the need for manual cross-referencing of table

```
                              TABLE 1

                  DEPARTMENT OF NATIONAL DEFENCE

                              VEHSIM

VEHSIM has been designed to give performance predictions which
have been shown to be typical for most operations. However, due
to operating conditions, driver influences, and other factors, your
results may vary from those predicted.

The data files used in the simulation are as follows:


              Chassis data file: IH-1754
              Tire data file: TEST
              Transmission data file: SPICER
              Engine data file: DTA-360

              Chassis manufacturer: NAVISTAR
              Chassis model: 1754

              Engine manufacturer: IH
              Engine model: DTA-360
              Engine configuration:
              Accessories (total) HP      3.400
              Transmission manufacturer: SPICER
              Transmission model: 5852
              No fo gears: 5

              Tire size: 10r22.5

              Chassis weight: 7500
              Body weight: 2500
              Payload weight: 14500

              Axle ratio: 5.09000
              Calculations in accordance with SAE J688


                   simulation results as follows


          Date = 01/25/89 time = 12:01:24


          VEH    ENGINE   ENGINE   DRAWBAR   NET%
          MPH    RPM      HP       PULL      GRADE


          Gear no = 1     Ratio = 7.1700
            2      626      40      6257      25.54
            4     1253      81      6548      26.73
            6     1879     141      7834      31.98
            8     2505     173      7154      29.20
            9     2700     180      6872      28.05
```

data. The user need only provide the pertinent truck data for simulations to be performed. In addition the program eases the user's requirement to enter truck data by providing a truck component data base. This data base contains detailed information for a wide variety of commercially available truck chassis, tires, transmissions and engines. The user can easily create new or edit existing data files to accurately simulate any particular vehicle. Thus, the component data base, can be mixed and matched to simulate the whole spectrum of wheeled commercial vehicles. An example of the input data and results of a simulation are provided in Table 1. The vehicle simulated is a typical 3-Ton van truck, similar to those operated by Base Transport.

Despite the wide spread use of SAE J688 in the industry, it is not without fault. It has several known limitations as summarized here:

1. based on old technology
2. data based on minimal testing
3. data underwent considerable extrapolation
4. no privision for radial tires
5. no provision for automatic transmissions
6. accessory power loss computations not available
7. no provision for estimating fuel efficiency
8. no provision to adjust aerodynamic drag factors

Recognizing these problems DSVEM implemented an upgrade program designed to update the equations for the variables affecting vehicle performance and to expand its capabilities. From SAE literature and industry sources, new equations for rolling resistance with provisions for accounting for the difference between bias ply and radial ply tires were inputed. Air-resistance equations incorporating recent truck data and aerodynamic ad-on devices were inputed. Driveline friction loss equations were updated using results from recent truck test data. In addition, provision was provided for incorporating accessory power losses.

```
Gear no = 2     Ratio = 3.8800
   8     1356      93        3802       15.52
  10     1695     129        4243       17.32
  12     2033     150        4103       16.75
  14     2372     167        3894       15.90
  16     2700     180        3656       14.92

Gear no = 3     Ratio = 2.1100
  14     1290      84        1891        7.72
  16     1474     107        2142        8.74
  18     1659     125        2220        9.06
  20     1843     138        2192        8.95
  22     2027     149        2127        8.68
  24     2212     159        2044        8.34
  26     2396     168        1966        8.03
  28     2580     176        1885        7.69
  29     2700     180        1815        7.41

Gear no = 4     Ratio = 1.2900
  28     1577     118        1197        4.88
  30     1690     128        1197        4.89
  32     1803     135        1156        4.72
  34     1916     144        1130        4.61
  36     2028     149        1073        4.38
  38     2141     155        1018        4.15
  40     2254     161         968        3.95
  42     2366     167         913        3.73
  44     2479     172         856        3.50
  46     2592     177         796        3.25
  48     2700     180         729        2.98

Gear no = 5     Ratio = 1.0000
  46     2009     148         598        2.44
  48     2096     153         545        2.23
  50     2184     157         492        2.01
  52     2271     162         443        1.81
  54     2358     166         387        1.58
  56     2446     170         330        1.35
  58     2533     174         272        1.11
  60     2620     178         210        0.86
  62     2700     180         149        0.61
```

Though no formal validation of the program has been done, experience has shown that the results in general are quite consistent with those obtained from manufacturer's proprietary simulation software. Future goals for the program, are to incorporate:

1. simulation of automatic transmissions
2. off-road soil conditions
3. fuel-economy prediction
4. driver/route simulation
5. prediction of acceleration performance

In conclusion DSVEM currently has the capability to accurately predict vehicle performance and to ensure that newly acquired vehicles meet the performance requirement of the user.

Note: The program is a DBASE III application running on a IBM PC compatible computer. Requests for copies and general inquiries should be directed to DSVEM 4-4-3
M. Gobessi

DSVEM 5
Special Equipment Vehicles

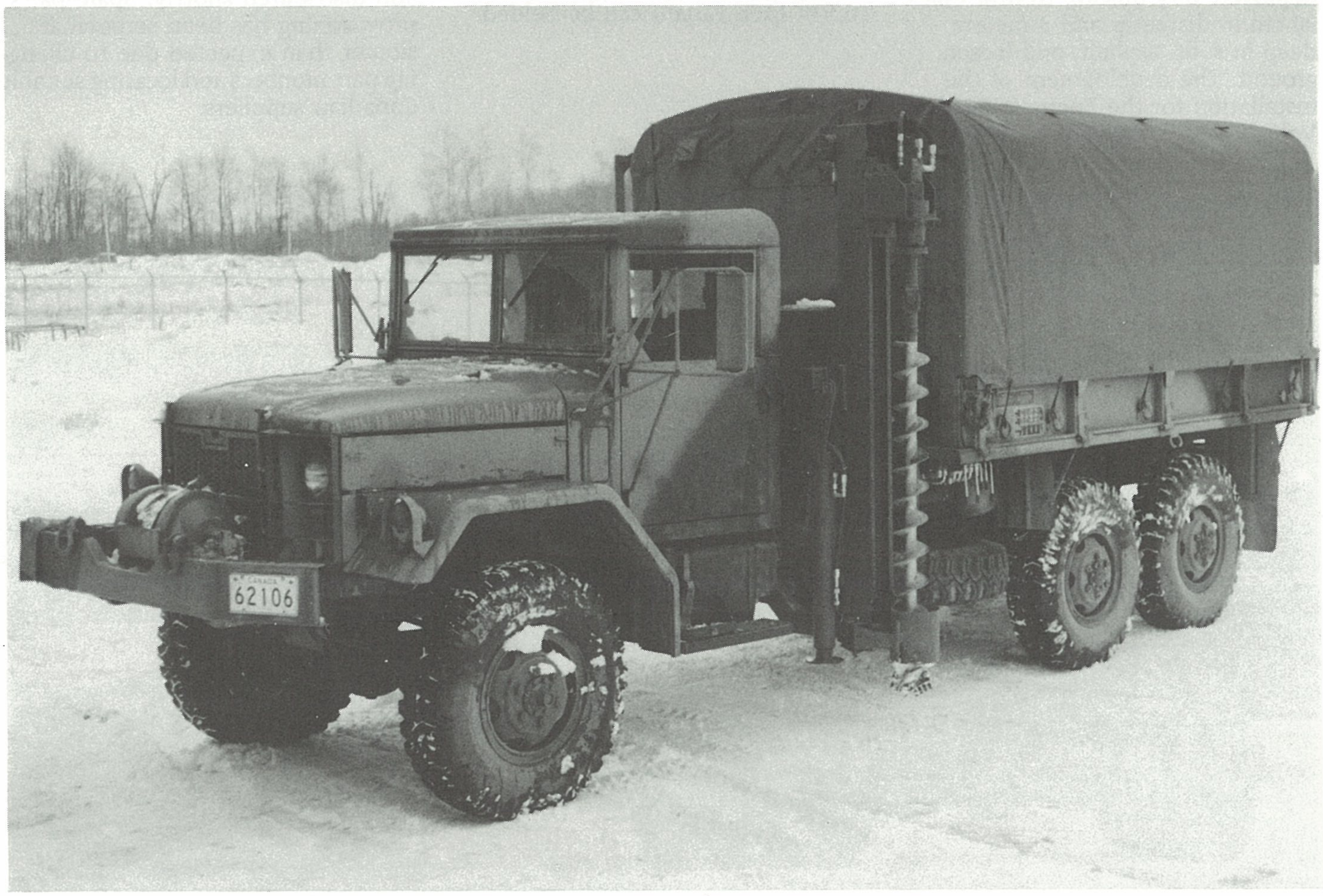
You may recall in our previous update to the LEME Journal that we announced a contest with prizes to any unit which could provide evidence that they had at least one 5/4 Ton SEV in its original CFTO Configuration. Unfortunately, we were not able to locate a contest winner. We seriously considered extending the contest to include MLVW SEVS. However, with the importance of configuration management being stressed so much lately, we probably would have had to award more prizes than would have been available to us.

Our request for more UCRs and TFRs met with a more positive response from most units. Keep up your efforts in forwarding these reports so that we can serve you better.

In addition to meeting the day to day technical and maintenance duties for our large fleets of SEVs, we also have management responsibilities for several major SEV projects including the development of new SEVs, the production and installation of SEV kits, and the refurbishment of existing SEVs. A description of some of these projects follows.

Spare Parts/ISO Shelter Project – DSVEM 5 has undertaken a project to develop a Spare Parts SEV for Combat Engineering requirements which uses the Kenworth Multilift Load Handling System, 20 foot ISO shelters, and MLVM storage cabinets. Since the system of truck and trailer with two ISO shelters can carry three times as many spare parts as a MLVM Binned Stores SEV, this system offers considerable savings in manpower and equipment. The system can be loaded/unloaded without other material handling equipment and the truck, once unloaded, can transport other palletized stores. Of particular interest to DSVEM 5, is that this is our first experience with the honeycomb type of construction that is used in the walls of the ISO containers. Other applications using this construction process will be considered if it proves successful.

Artillery Gun Tractor (AGT) SEV – Responsibility for the production of the AGT SEV was assumed by DSVEM 5 at the close-out of the MLVW Project. The AGT consists of a MLVW kitted for use as the prime



mover for the 105 mm towed howitzers. A raised deck has been added to the MLVW cargo body to provide compartmentalized storage of ammunition which is separate from the troop carrying area; space is provided to store other equipment under cushioned troop seats and in shelved storage units; and a dc electrical system is included to provide for the interior lighting and the operation of a Cooking and Boiling (CBU) for the preparation of hot water and soups. Production and installation of the adapter kit for these SEVS was completed in the Summer of 88 under contract in Winnipeg, Ottawa and Dartmouth. These SEVS have been well received by both Regular Force and Militia units across Canada.

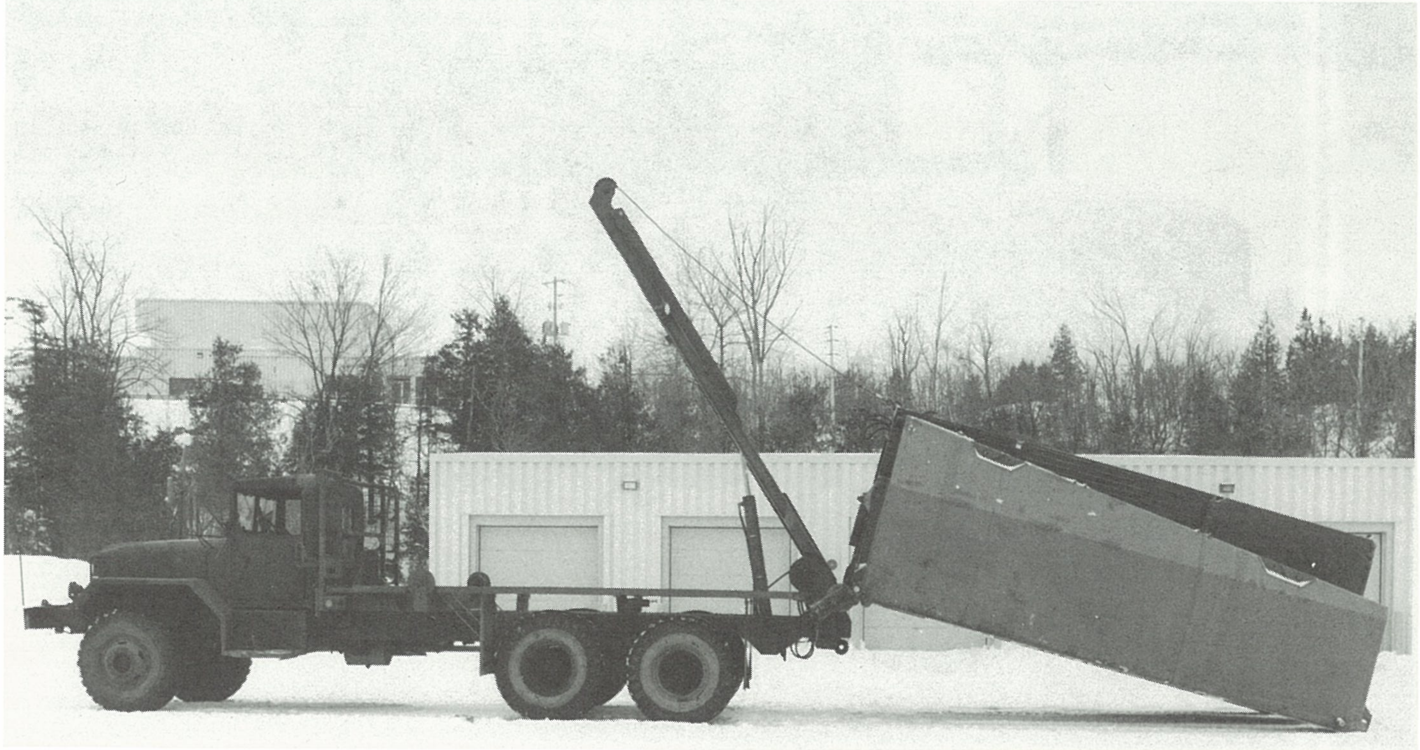
Auger Kit – Following the successful completion of an auger kit for the M113A2 APC Dozer by DCMEM, a requirement was identified for the kit to be installed on the MLVW Engineer Section Vehicle SEV. The purpose of the auger kit is to drill charge holes for cratering by Field Engineers. The SEV can now be deployed very quickly to drill holes 20 cm in diameter and 3 meters deep in soils, asphalt, and frozen ground. The development of the installation for the Engineer Section Vehicle was completed by PMO MOST and DCMEM. DSVEM 5 is now managing the installation of these kits on 48 vehicles across Canada. Completion is scheduled for March 89.

Medium Floating Bridge – DSVEM 5 has assumed responsibility for another major installation kit which will soon be manufactured. The Medium Floating Bridge Transporter Kit (SEV) is used to launch, recover, and transport floating bridge units for Field Engineers. The SEV consists of an A-frame operated by a hydraulic system mounted on a 5 Ton SMP chassis.

With the SEV in location, the floating bridge can be deployed in about five minutes and recovered in about ten. With the A-frame in its stowed position, a cargo pallet can also be placed on the chassis for the transport of other engineering stores. A RFP is being actioned for the installation of 14 kits at CFB Chilliwack and CFB Gagetown. Installation of these kits is to be completed in time for Summer 89 engineering training. These SEVs will serve as interim training vehicles until the HLVW MFB variant can be fielded.

Multi Purpose Van Body (MPVB) Refurbishment – DSVEM 5 has initiated a refurbishment project on the MPVB used with many 5/4 ton SEVs. Based on the results of an engineering study, it is expected that this project, at a cost of $2.9 M, will enable that fleet of about 1300 MPVBs to be kept in service for a further 15 years. The main activities in this refurbishment project will be the replacement of the floor and linoleum covering; the repair of damage to structural members; the painting of the interior and exterior; and the inspection and repair as necessary, of items such as windows, door seals, and door hardware. The MPVBs are being stripped of Check List items at the Unit level and of installation kits at Base Maintenance sections. The refurbishment is expected to take 3-4 years and will be completed at Correctional Institutions across Canada and by contract in CFE.

Iltis SEVs – DSVEM 5 accepted LCMM responsibilities for the Iltis SEV fleet in November 88. The installation CFTOs for the SEVs are being completed and will be published and distributed shortly. Spare parts provisioning has been somewhat slower than expected due to changing part numbers and locating suitable Canadian suppliers.



Craftsmen's Corner

RCEME 50th Anniversary Fund Raising Campaign

By Major A Thibert

By now fund raising initiatives by CFSEME have been well publicised. Two of the major undertakings were initiated during the annual LEME Bonspiel held at Borden during the period 2–5 February 1989. Both of these activities were kicked off in grand style by BGen Hanson. To say the least, our Branch Advisor set a high standard for contributions by presenting the first individual donation to the Trust Fund in the amount of $1000. This marked the start of the fund raising campaign which was quickly followed up with the second kick off ceremony for the Great 1989 Car Raffle. The buying frenzy that followed the token purchase of the first book by BGen Hanson resulted in over 350 tickets being sold. Ticket sales for the remainder of the Bonspiel brought the total number of tickets sold to well above the 560 mark. An excellent start to say the least.

With these two initiatives well underway the next phase of the plan was to pick up the momentum set that weekend and carry the message to the various units in Canada and CFE. This was accomplished by a series of briefings by the Commandant CFSEME, CI and OC HQ & Stds Coy in Ottawa to cover the Capital Region, FMC Headquarters to cover all FMC Units across Canada and CFE to cover both Air Group and Brigade Units. It goes without saying that the toughest assignment was assumed by OC HQ & Stds Coy when he sacrificed himself and volunteered for the CFE Briefings. The trip was quite successful in that a series of four briefings were conducted as well as two CFN/RFC interviews made in both official languages. No doubt repatriating personnel will be most aggressive in buying tickets as they will want to arrive back in Canada this summer and have a brand new 1989 Chevrolet Corsica waiting for them.

It would appear that Col Nappert's appeal enjoyed equal success in Ottawa as it is now expected that the 5000 tickets reserve will have to be distributed earlier than forecasted. The message carried to FMC Units by LCol Herbert in the form of a challenge will undoubtedly bring equally good news. Support for these fund raising initiatives is extremely good. A great number of personnel are coming forward with numerous and worthwhile suggestions for both fund raising initiatives and publicity campaigns. Although all cannot be implemented at once, those that fall within the realm of possibilities, such as bumper stickers, beer steins, etc., will be attemped during the fund raising campaign. Remember to continue to be part of the EME Action Team and pledge your support to make the 50th Anniversary Celebrations worthy of our Corps. The Trust Fund account now stands at over $5000 and growing.

Major Al Thibert accepts the cheque for $1,000. donated to the 50th Anniversary Fund by BGen J.I. Hanson.

Col J.G.G. Nappert, Comdt of CFSEME, sells tickets during the LEME Bonspiel Banquet.

The first book of raffle tickets is bought by BGen Hanson. Maj Thibert takes the money before Col Nappert hands them over.

CFSEME Hosts 25th Annual LEME Bonspiel

Winners "A" Division and recipients of the Base Maintenance Trophy are:
Maj Don Tiller/CFSEME
Maj Brian Hook
Capt Tom Temple
Capt Pierre Dubé

Winners "D" Division and recipients of the CFSEME Trophy are:
Sgt Lorne Eastaugh/BML Borden
Mr. Al McLaughlin
Mr. Mitch Biddiscombe
Capt Jim Bonney

Led by the Piper, the participants line up for the opening ceremonies.

By Major J.C. Giguère

No winter is complete for LEME without the annual bonspiel. This year the Silver Anniversary event was held in Borden, from the 2nd to the 5th of February.

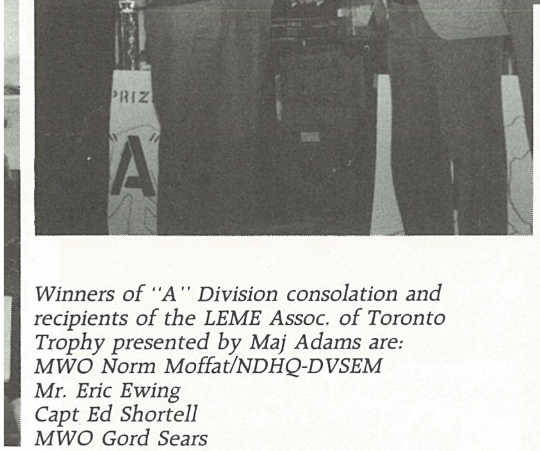
CFSEME, as the home of the Branch, was again the host for this very popular event. Sixty-four teams gathered on Thursday afternoon and evening for the Meet 'n Greet. The competition would not be complete without this opportunity to get into the spirit of things and renew many friendships and acquaintances. As might be expected, it lasted till the wee small hours of the morning, which was very obvious when looking at some of the competitors who turned up for the first draw at 0700 hrs, Friday morning.

At 11:30 on the first day as tradition has it, the Pipers, followed by the teams, lined up on Sheet #2 at the Circle Pine Curling Club for the opening ceremonies.

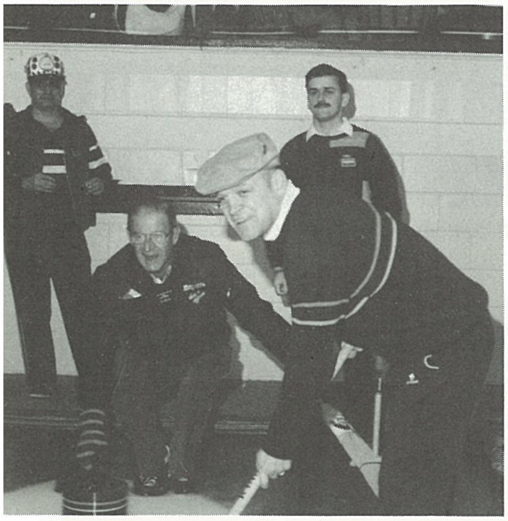
Retired CWO J.C. "Jack" McElroy, founder of the event, which began back in 1963 at CFB Petawawa, had the honour of throwing the LEME Rock to declare the 25th Annual LEME Bonspiel officially open. Col

Winners "B" Division and recipients of the DGLEM Trophy are:
Mr. Don Halladay/London
Sgt Mel Rolph
Sgt Bill Labidie
Maj Stu Ames

Winners "C" Division and recipients of the 2 SVC BN Maint Coy Trophy are:
MWO Pierre Damour/CFSEME
MCpl Laurent Levesque
Sgt Marcel Frigon
Sgt Frank Poulon



Winners of "A" Division consolation and recipients of the LEME Assoc. of Toronto Trophy presented by Maj Adams are:
MWO Norm Moffat/NDHQ-DVSEM
Mr. Eric Ewing
Capt Ed Shortell
MWO Gord Sears



Retired CWO Jack McElroy, throwing the LEME rock while LCol McDonald and Col Nappert are sweeping.

The Piper and CWO McElroy take the traditional drink.

Nappert, Commandant of CFSEME, and retired LCol McDonald, skip of the Scotland team, were on hand to sweep the rock.

As the spectators began to crowd the CPCC and Dyte Hall to witness the games, it was clear that 24 hours a day of steady competition was starting to take its toll on the players. By Saturday afternoon one could see, as one may say, the cream rise to the top.

At last, Saturday night rolled around and the players were finally able to take a break to attend the banquet. Brigadier-General J.I. Hanson, Director General of Land Engineering Maintenance, was present to say a few words to the troops. Due to his heavy schedule and something to do with a hot tub, he departed shortly after, but his words of wisdom were well appreciated by all.

Finally, on Sunday afternoon the winners emerged and it was all over but for the crying and celebrating. The winners have our heartiest congratulations, and the others are encouraged to try again next year.

We would also like to thank everyone who participated in the preparations and operations of the Bonspiel. It was a job very well done. So, until next year, ARTE ET MARTE.

New Building at CFSEME

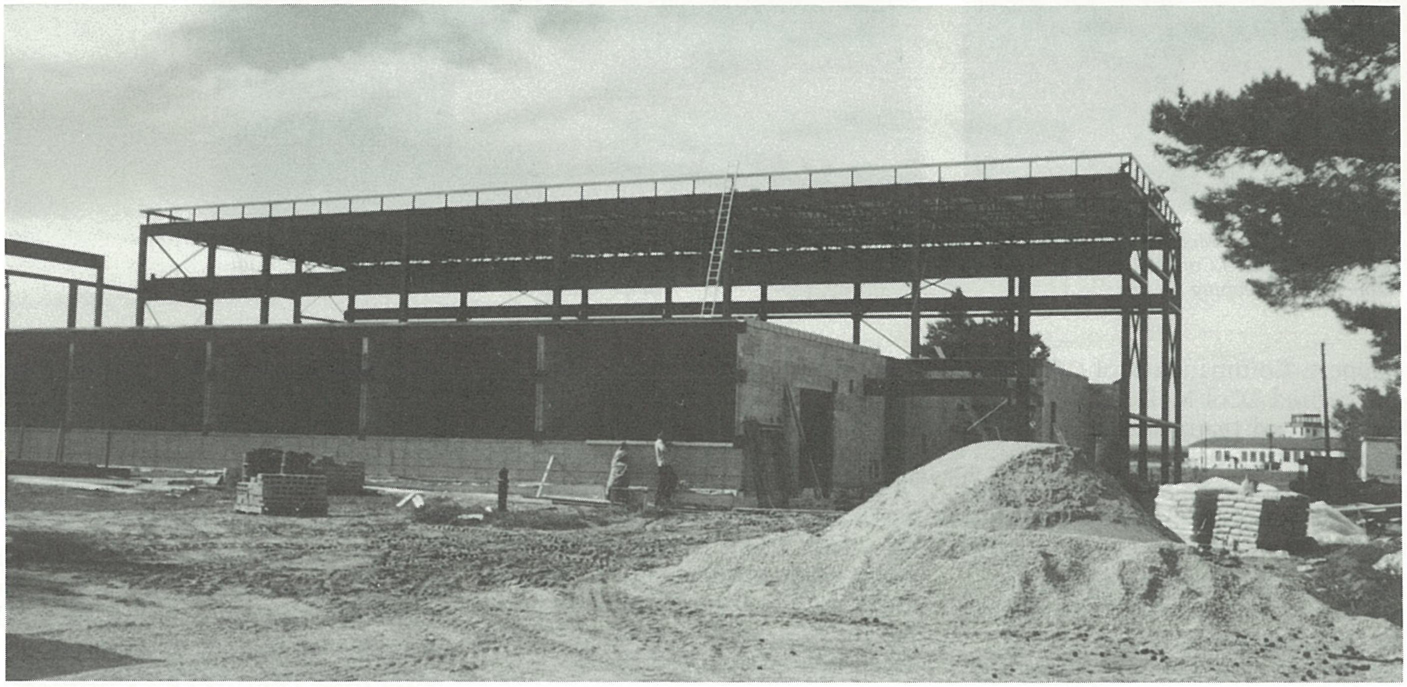
by Capt Dave Blake-Knox

Those of us that have been lucky enough to visit CFB Borden in the last year or so, may have noticed a flurry of building activity on Borden Road just past Croil Hall and across from CFSEME HQ. The girders of a new structure are rising out of the sandy soil beside the sports field, as the new Armaments Building takes shape.

Funded in part by the TWO Under Armour (TUA) Section of the Anti-Armour and Light Armoured Vehicle (AALAV) project, this building is being constructed to house the Armaments Cell of Weapons Section, Artisan Company.

For those readers that may be more inclined towards automotive engineering, the Concise Oxford Dictionary defines armament as "military weapons and equipment, esp. guns on warships." Of course, for our Land Forces, those warships are the modern Armoured Fighting Vehicles (AFVs). The training that will be conducted in this new building will cover the M109 Self-Propelled Howitzer, Leopard Main Battle Tank, AVGP, the New TUA turret, and of course the old stand-by towed howitzers 105 mm (C1 and L5).

The West side of the armament building that will contain the armoured vehicles and overhead crane capable of lifting off a tank turret.



The East side of the new armament building showing the labs and classrooms.

In August the steel girders go into place.

The building was started in April 1988 by Trecon of Toronto and is expected to be opened officially sometime this year. There is room allocated for a future small arms annex to be attached, completing the building.

The rapid expansion of the variety of armament maintained by the 421 Weapons Tech has meant that the cramped quarters in Croil Hall have long been insufficient. The new building will allow FCS section, also cramped, to implement new training by using what were previously Weapons facilities.

The new building will have many features and capabilities including:

- one large bay
- three small bays
- ten classrooms
- tool crib
- $200,000 worth of new hydraulics training aids
- eleven ton overhead crane
- eight inch thick re-enforced floor to support the weight of an MBT
- total value of the building is about $2,000,000.00.

Staffing has been initiated to have the building named, in accordance with LEME Senate direction, after the late LCol LeSieur Brodie, an active member of the LEME Association and member of the Order of Canada.

The official turning of the sod, 6 May 88, in true LEME style. Colonel Gilles Nappert at the controls, Maj Richard Hulmes directing, and MWO Al Wash watching with interest.

CFSEME Francotrain Efforts

By LCol R.D. Herbert

As any Francophone technician or officer in our Branch could tell you, technical training in the French language was almost non-existent until recently. In fact the only training conducted in French was the QL3 Veh course taught at St Jean and the QL5 Veh course taught at CFSEME. Conditions are improving.

Starting last year, CFSEME conducted its first French serials in both the W Tech L and FCS occupations at the QL3 level. In addition one serial of LEME Officer Phase II was conducted entirely in French – the first time training has been made available for Francophone LEME Officers in their mother tongue. Veh Coy also continued to show the way by introducing the new QL6A course in French. Progress was definitely made in 1988.

In 1989 CFSEME intends to continue its pursuit of providing additional courses to students in their primary language. The intention this year is to introduce QL3 training in both the Ammo Tech and Mat Tech occupations. This will complete the initial introduction of French language courses in all trades taught at CFSEME. Officer training in French will continue to expand with the Veh package of Phase III being taught entirely in French as well as a number of POs in Phase IV.

Future plans call for the introduction of French courses at the QL5 level approximately two years from now to meet the requirement of this year's QL3 graduates. OSQs have a much lower priority but will be introduced when resources permit.

Francotrain is resource intensive. The School never has enough bilingual instructors to meet its needs. French reference material is difficult to obtain and lexicons are usually non-existent. The translation of CTPs, lesson plans, handouts and question banks is a very slow and difficult process but it continues. Despite all of these impediments, progress will continue to be made. Remember to do your part by contributing to the development of bilingual lexicons, reference material and training aids when you work in a PMO or occupy an LCMM chair.

New QL6A Training

By Capt G.R.C. Emmerson

Writing an article about new QL6A courses is a subject fraught with much danger. On the one hand, it is possible to fill many pages on the details for every occupation, thus boring people to tears. On the other hand, one could find something else to write about, and incur the wrath of those who strongly suggested this article in the first place. So, with a bold face and some trepidation, we will try and avoid the two extremes.

Before the Occupational Analysis, published in 1983, gave new direction to our training, the 6A had been a more advanced version of the OJT 4, and of equally dubious value. Depending on the limitations of the workshop and who signed it off, it may or may not have been worth the paper it was written on. Secondly, there was no in-house training between QL5 (brand new Cpl) and QL6B (long in the tooth WO). This wide gap completely ignored the first two levels of supervision, (MCpls and Sgts), and the fact that they were the senior hands-on techs. Under the new plan, the old QL6B would disappear and in its place would be new QL6A and QL7 courses. Both would be in-house career courses. QL6A would be the last level of hands-on technical training with an emphasis on trouble shooting and the ability to supervise junior technicians. It was to be taken at the MCpl level and be a prerequisite for promotion to Sgt.

Well, all that was a few years ago now. Since then, all the new courses have been written and we are in the midst of implementation and adjustment training. As each occupation had different considerations and problems, the best thing to do now is deal with each occupation separately.

Veh Tech 411 – The CTP for the new QL6A was approved in March 1988 with the first course being run a month later. There was no gradual phasing in or out of training. QL6B training ceased with the introduction of the first QL6A course. However, the new QL6A was also to be loaded with Sgts who had not qualified QL6B. After they have all been through, the course will be strictly for MCpls. This constitutes the only form of adjustment training for the Veh Techs. The new course is a total of 55 working days, which includes 15 for Common LEME training.

W Tech L 421 – The last QL6B course was run in June 1988 and the first of the new QL6A courses started with 8901, 13 Mar 89. The adjustment training for W Techs L is not as straightforward as it was for the Veh Techs. Anyone qualified QL6B will not be required to do the new QL6A but will, of course, have to do the new QL7. Those MCpls who did not have their OJT 6A signed off before 31 Dec 88, will have to attend the new QL6A course which is 62 working days long, including the 15 days Common LEME. These are the two easy ones at either end of the scale. It is the Sgts and MCpls who *do* have the old OJT 6A qualification who will need adjustment training. Even though they have already passed their 6A, which qualifies them for promotion up to and including WO, they must take the QL6A adjustment course, and pass, or the merit boards will not look favourably on their careers. Just to rub salt into the wound, the adjustment course is *likely* to be 67 working days long, so that it can include hydraulics training that they would not have received on the old QL3 and QL5 courses. The work 'likely' is used because at this point the adjustment course is not approved and scheduled into the training plan. The message dictating who needs which course is DPCAOR (POL) 581 dated 051800Z Dec 88.

FCS Techs – Implementation of the new QL6A and adjustment training for FCS Techs is quite straightforward as there were already QL6A courses being run at CFSEME for MOCs 432 and 433. There was very little change needed to bring them up to new training requirements. The CTS Adjustment Board that sat at TSHQ in November 1987, recommended that there need not be any adjustment training because the difference between the old and new courses was minimal. It should be noted, however, that official sanction of this plan has not been received at the time this is being written. Both new QL6A courses have been running since the fall of 1988, but the 432 QL6A is shorter than the planned length because some training aids are not yet available. When the course is running at its full length, it will be 88 working days long. The 433 QL6A is 79 days. As with the other occupations, these two courses include 15 Common LEME days. The last two QL6B courses are scheduled to be run in 1989.

Neither the Mat Techs 441 or the Ammo Techs 921 were part of the new training implementation, however, they are both worthy of note.

The Mat Tech occupation is new anyway, so there was no QL6B to be dropped. The QL6A, (47 working days), started in the spring of 1987 and to date four courses have been run. In addition, two adjustment courses were run in 1986 for Senior NCOs who had QL6B in their old 500 trades. In 1985 and 1986, three *conversion* courses were run, basically for MCpls who had qualified QL6A in their old 500 trades and needed to convert to 441 QL6A. All conversion or adjustment training for the 441 MOC, (including QL5 for the old 500 trades), has finished now.

Ammo Tech 921 – As we all know, this is not a LEVEL occupation, but it is most certainly a CFSEME responsibility and an integral part of the School. The Ammo Techs introduced a new QL6A in 1980. Prior to this, the QL6A had been the final course, which left a lot to be desired at the higher ranks. So, a QL6B was introduced, and the QL6A became a correspondence course to fill the gap between the QL5 and QL6B. As with our LEME occupations, this QL6A is a prerequisite to promotion to Sgt. Each year, at the same time, a course package is sent out to preselected MCpls, who then have six months to complete all assignments and submit their work to CFSEME Standards for marking. Course reports are sent to the Career Manager and Unit COs. The course is quite challenging and ensures the student is fully up to date and able to take over a responsible position as a new Sgt.

Hopefully, this overview will answer most queries about the new QL6A training, but if there are more, the instructors and standards people in CFSEME are only too willing to answer them. They are as close as the telephone.

Regimental Company Facilities

By 2 Lt J.L.A. Audet

The Borden south side facilities, previously occupied be CFSEME Regimental Company (Regt Coy), could easily have been described as ancient and should have seen their end many years ago. Just prior to summer '87, two buildings were condemned and scheduled for destruction; however, the new facilities were not expected until the 1990s. To solve the intermediate problem of space, Regt. Coy was forced to move part of its domain to E-196 on the north side of base. E-196 was acquired from the Candian Security and Intelligence Service (CSIS), who have since moved to Ottawa. This option not only solved the intermediate need for facilities but, with the addition of several port-

This photo depicts the front of Regimental Company Headquarters, in all its glory.

This photo illustrates a few of the CP field offices, as well as the smaller size portables, used as staff offices, in the background.

ables, also alleviated future problems related to the ever-increasing number of courses and student loadings.

The transition between the old A-94/95 to the semi permanent E-196 was as smooth as such a move could be without disrupting everyday training but not without its problems. E-196 was not designed to handle the student loading of the Coy and several portables had to be erected. With an initial installment of 6 small portables and finally an additional one small and three large portable classrooms, Regt Coy finally has all the space necessary to meet training requirements. Even though space was the most evident problem, it was a combination of all the small ones that caused the headaches. As CSIS was a different government department there were some major negotiations as to what was going to be left behind. For example, we could keep the Air Conditioners but they took the door handle assemblies from all the internal doors (you figure it out).

E-196 has several key benefits over the south side buildings. First, it holds an auditorium that can accommodate up to 50 people at any one time, and is equipped with all the audio visual aids available. Secondly, it offers a computer room which now holds 12 computers that are used primarily by Workshop Management Systems section to teach all LMMA and LOMMIS related courses. The facilities also offer a cloth model room, located in one of the portable classrooms, where staff and students simulate the tactical layout of assorted field organizations and systems. Additionally, the coy increased its number of unmounted field office CPs from four to six. The CP vans are used to train students in both radio and field control office procedures in a simulated tactical environment. As they are the only unmounted CPs on base, they are also used extensively by other schools in CFB Borden. Finally, and of particular importance to all LEME personnel, the LEME Kit Shop can still be found as part of the Regt Coy Library and is still by Pat Terry.

Regt Coy still uses two older buildings, presently occupied by Craftsmen Trg Platoon. Building A-96 is used to conduct all QL3 Common training, and building A-98 is occupied by the Coy Quartermaster.

Overall the move has improved the effectiveness of Regt Coy. While the newer facilities provide a better training atmosphere than the old A-94/95, the decentralization has caused some major support problems. Regt Coy is looking forward to establishing itself in its own single complex which is to be colocated with the remainder of CFSEME and specifically designed to meet its training role.

Occupation Advisor's Update

421 Weapons Technician (Land) Occupation Update

By LCol W.S. Tait, Occupation Advisor W Tech L

Introduction

With his move to the AALAV Project in July 1988 as the System Engineer, LCol J.P. Dagenais has relinquished his duties as the Occupation Advisor for the W Tech L trade. On behalf of all the members of the trade, a hearty thank you is extended to LCol Dagenais for his efforts. Fortunately CWO Jim MacKenzie is staying on as the Assistant Occupation Advisor to guide the incumbent in the right direction.

Personnel Matters

The Weapons Tech trade is indeed healthy with respect to both the quality and quantity of the people in the occupation. As a member of the last NCM Merit Board, I can assure you that there is no shortage of excellent technicians and NCOs in the 421 trade. And, as of January 1989, there is no shortage of Weapons Techs at all. In fact, the trade presently has a strength of 8 technicians over our requirement. This is largely due to the efforts of CFSEME. In June 1987, the School successfully instituted a "Get Well" program to address the problem of a shortage of technicians in the 421 trade. It is unlikely that CFSEME will get much relief in workload in the near future however as it is expected that the trade will continue to grow at a rate similar to the last few years which saw an increase in our technician requirement of about twelve per year.

Some of the new positions which have been filled by Weapons Techs recently include several LLAD positions, the ETSM of 4 Air Defence Workshop in Lahr (CWO Tom Mulrooney), a new job in the Director of Documentation and Drawing Services in NDHQ (MWO Nick Bryant) and the first ever W Tech L in Goose Bay Labrador (Sgt Keith Luffman). For 1989/90, Weapons Tech will be filling new positions in St John's Nfld, Shearwater NS, and PMO Tank in Ottawa as well as a new CWO slot in DLAEEM 2 in NDHQ.

Training Matters

There have been some significant changes in the training of Weapons Techs. First of all, in recognition of the expanding technology requirement, POET training for the W Tech L trade has been approved. However, with the reorganization of POET Block Training, it has been determined that Block 1 no longer meets our requirements. A steering committee has been formed to identify the needs of all EME trades for POET training. Upon completion of this study POET training will commence for Weapons Techs and Vehicle Techs. It is expected at this point in time that the training will take place at CFSEME.

The last W Tech L 6B course was completed in June 1988. Henceforth, the highest technical qualification for the trade will be achieved through attendance on a QL 6A course. The first course for Weapons Techs is scheduled to start 13 March 1989. The course will be compulsory for all those who are not currently qualified 6A through OJT. For those who are already 6A qualified, an adjustment course will have to be taken to ensure that a consistent qualification standard is achieved.

Once all of the technical training is out of the way, the only hurdle to the upper echelons in the trade, aside from excellent on-job performance that is, is to qualify on the QL 7 course. To date three of these courses (which are common to all EME trades) have been run. CWO MacKenzie had the good fortune (?) to be selected as a member of the Directing Staff for the last course. Although the course is demanding, Mr MacKenzie highly recommends that all our technicians strive to be selected for it. He described the course as an "eye-opener" and one which puts all EME techs on the same level "meaning they are all just as lost".

In closing the section on training matters, for those of you who are feeling a lack of excitement in your employment, the W Tech L trade is now one of the occupations eligible for EOD training.

New Equipment

Equipment introduced during the past year includes the GPMG C6 which replaced all the ground mounted GPMGs C5, the Sustained Fire Kit (SFK) for use by the infantry with the GPMG C6, a BFA for the HMG .50 cal M2HB, a sub-caliber device for the M72 LAW and of course the ongoing issue of SARP weapons.

The Rifle 7.62 mm C3 (Sniper) is undergoing a midlife refurbishment which includes an improved barrel, receiver and sighting accessories. This project is expected to be completed before the end of 1989.

Current inventories of the M109 and L5 Pack Howitzer are scheduled fo rebuild. Sixteen L5s will be rebuilt this year at Oto Melara in Italy; the remainder scheduled for the early nineties. The M109 fleet is scheduled to commence R&O in 1991/92 with the Canadian-based howitzers being completed at 202 Workshop Depot.

A trial is presently underway at LETE testing several 9 mm pistols, one of which will be a replacement for the Browning .32 cal pistol which is no longer manufactured. The new pistol will be used by general officers, pilots and member of Special Investigation Units. The Browning 9 mm No 2 MK 1* will remain in service as the primary pistol for genral service use.

A Cadet small bore rifle is in the early stages of development. This rifle will be a .22 cal version of the C7 rifle.

Finally, some possible long range projects include the replacement of all vehicle mounted machine guns with a 7.62 mm chain gun, upgunning of the 105 and 155 mm towed howitzer, replacement of the L5 pack howitzer and procurement of additional M109s and the Multiple Launch Rocket System (MLRS).

The Future

Although the Weapons Tech trade is considered healthy, there is a great deal of concern in the trade concerning the increasing burden which is being forced on our technicians through expanding technologies. This concern has been expressed by the senior technicians in the trade during the last two Exercise BLUEBELL 421 Working Groups. It was the collective opinion of these groups that due to the introduction of new equipment and technologies our technicians were finding it increasingly difficult to be proficient in all aspects of the trade and that as a result our service to our customers in the Army was being gradually degraded. The working groups further generally agreed that the solution to this problem was to split the trade into two occupations along the lines of a large caliber/turret systems technician (Gun Mech?) and a small caliber technician (Armourer?). Many steps must be taken before implementing such a major occupational change, not least of which is ensuring that the resulting two occupations are viable, offer reasonable career advancement and meet the needs of the Canadian Forces. The decision to split, if found to be feasible, will not be an overnight task. Many implications will have to be studied and of course approval must be obtained. Suffice it to say that the 1990s are going to be very challenging for the W Tech L.

441 Materials Technicians Update

INTRODUCTION

Jan 89 marks the start of the final year of the Five Year Implementation Plan for the Materials Technician Occupation (Mat Tech). This occupation, which was officially formed on 1 Jan 90 has matured a great deal during the past four years and by 1 Jan 90 will reach the majority of the milestones in the original implementation plan.

AIM

The aim of this article is to update you on the current status of the Mat Tech Occupation and to advise you of some relevant activities and concerns.

OCCUPATIONAL ADVISOR

APS 88 saw the « Change of Command » of the Mat Tech Occupational Advisor and Assistant Advisor. LCol Lydon moved to PMO LLAD and handed over the responsibilities to LCol Beselt. LCol Lydon held the position of Occupational Advisor for three years and guided the occupation through its early years of development. MWO Chaloner, who held the Assistant Advisor's position, moved on to become the Mat Tech Career Manager and was replaced by MWO Slominski. MWO Chaloner is to be commended on a number of initiatives including the Mat Tech 441 Newsletter which was published for the first time in Dec 87.

ESTABLISHMENT

When the occupation was initially formed in Jan 85, it consisted of 249 technicians, all ranks. In the subsequent four years it has grown at a tremendous rate and now stands at 289. It is anticipated that this number will continue to increase and should be at 295 by APS 89. The approximate establishment as of Jan 89 is:

Rank	Establishment	Strength	Difference
CWO	2	2	–
MWO	5	6	+1
WO	15	12	−3
Sgt	47	32	−15
MCpl	49	49	0
Cpl	139	153	+14
Pte	32	23	−9
Total	**289**	**277**	–

A few comments about these numbers! The shortfalls at the Snr NCM level will be corrected through the normal process of promotions. It is anticipated that the large shortfall at the Sgt rank will be corrected over a two or three year period in order to maintain the high selection standards for promotion and to prevent « a bump » in the occupational planning model. The numbers look quite good at the Cpl/Pte level, however these numbers look quite good at the Cpl/Pte level, however these numbers include all of the students undergoing QL3 level training. In actual fact, the total effective strength is about 250 technicians.

As with the other 400 series occupations, promotions for Mat Tech have been quite good. Totals for 1988 were:

to CWO – 1
to MWO – 2
to WO – 2
to Sgt – 11
to MCpl – 28

Under the original plan, MOC 500 technicians were to fill some Mat Tech positions during the five year implementation plan. As of APS 89 this aspect of the plan will end and there will be no more « Blue Jobs » in our positions. The good news is that we are now on our own. The bad news is that we will not have enough trained technicians to fill all of the vacancies. While it is difficult to forecast the exact shortfall, it would appear to be in the area of 20–30 technicians. A « Get Well Program » is now underway to address this problem but more about that later.

The bottom line as far as the establishment is concerned is that the Mat Tech is a growth industry. Look for a shortfall of about 20–30 technicians (about 15% of establishment) for the next year or so.

TRAINING

All Mat Tech training is now well established at CFSEME. A Course Training Standard (CTS) Review was held in Trenton in Dec 88 to review and formalize the adjustments that have evolved to the origianl courses. The following changes were proposed:

TRAINING DAYS

	Present		**Proposed**	
	Tech	**CET**	**Tech**	**CET**
QL3	156	13	163	19
QL5A	70	2.5	98	10
QL6A	30	14	33	15
OSQ 441.01 (Adv Machining)	92		82	
OSQ 441.02 (Adv Welding)	32		47	

Note: CET — Common EME Training

I would like to emphasize that the purpose of the CTS Review was to complete minor adjustments to the present training and input the findings of the QL3 and QL5A course validations. There was no attempt made during this CTS Review to revamp the Occupational Specification.

Training of Mat Techs at CFSEME is progressing well despite some facility problems at the School. The « Get Well Program » is pushing the training facilities beyond their capabilities and some problems have been encountered. Progress is being made to correct some of the occupational health hazards associated with Hanger 12 and a new Material Technician training facility is high on the CFSEME Facilities Development Plan. A number of new pieces of equipment such as the Linde Plasma Arc Cutting System, Electronic Vinyl Sealing Machines and Computer Controlled Welding Simulators are also being introduced at CFSEME to keep our technicians and training methods current with the latest technologies.

As mentioned earlier CFSEME is involved in a Mat Tech QL3 « Get Well Program ». The aim of the program is to increase the throughput of students in order to make up the shortfall of technicians in the occupation as quickly as possible. The annual production rates for Mat Tech courses are:

Course	**Serials/ Yr**	**Students/ Yr**
QL3	4	40
QL5A	3	30
QL6A	2	20
OSQ 441.01	1	5
OSQ 441.02	2	10

There are still some concerns regarding various aspects of training for Mat Techs:

a. **New Equipment/Technologies.** New equipment and repair responsibilities demand that new skills be added to the Mat Tech repertoire. Areas of current interest and concern include the BV206 and its requirement for skills in fiberglass repair and the various new types of bridging being added to the engineer inventory which require expertise in the areas of inspection and repair. OSQ training may be required for this equipment.

b. **OSQ 441.02**. There is still some concern about the method of instruction on this OSQ. A wide variety of welding techniques are taught. Problems are often encountered with hard to get materials and the evaluation of test pieces. CFSEME would like to include more battlefield repair technique training. We don't think we have the "optimum" solution for this course yet and further refinements may be necessary.

c. **Rough Carpentry**. There has been criticism on the lack of training given to Mat Techs in this area stating that it does not meet the needs of the user. Over the past few years it appears that the expectation of the user has grown significantly in what is expected of the Mat Tech in the area of carpentry. The task, as quoted from the Trade Specification is:

"Inspects, repairs, and constructs components such as trim vanes, cargo vehicle bows, shelving, creating and dunnaging."

As you may notice, there is nothing in the specification about refinishing furniture or building the CO a bookcase. The responsibilities in the area of carpentry are very limited and there is no plan to expand them at this time.

d. **OJT QL4 Reference Publications**. Problems have been encountered in obtaining the required references for the OJT QL4 program. Action is now being taken to correct this situation. If you are having problems at your area, contact the Assistant Occupational Advisor for more information.

MATERIALS ENGINEERING

In addition to the occupational advisor responsibilities, DCMEM 2 is also designated as the centre of expertise for materials engineering. A major problem to this point has been a lack of engineering expertise in the materials engineering discipline. Areas of particular concern have been the development of welding specifications and repair procedures for some of our major equipment.

In order to meet the requirement in this area, a contract is being established with a civilian engineering firm that specializes in the area of materials technology. This idea is not a unique solution to a difficult problem and is used by the Navy and Canadian Coast Guard to provide specialized engineering support to their fleets. It is hoped that this will provide the engineering expertise needed to support the new materials and technologies being added to the Mat Tech.

THE FUTURE

I have highlighted some of the "Good News" and "Bad News" in the evolution of the Mat Tech. What about the future? Do we have it right? What changes must we make to ensure the Mat Tech meets the needs of the user?

It would appear that one of the biggest problems with the occupation is the amount of knowledge and skills that we are trying to teach to one individual. It is imperative that we not only teach our soldiers the proper technologies but even more important that we employ them in a manner which will ensure that their skills are developed and high levels of expertise maintained.

The Five Year Implementation Phase will end in Jan 90. An Occupational Analysis for the Mat tech 441 Occupation has been requested for 1990 to review the status of the occupation and recommend what changes, if any, are required.

SUMMARY

The Mat Tech has become a key member of the LEME Occupational structure. As new technologies and equipment are introduced to the CF, it is anticipated that he will continue to play a key role in our maintenance units and depots. As the Five Year Implementation Phase comes to an end, there will be a renewed effort to ensure that the Mat Tech is structured, trained, and employed in an efficient and effective manner to meet the need of the Army.

202 Workshop Depot Update

Leopard Repair and Overhaul

By H. Santana

With the aging of the Centurion battle tank and the need to equip the Canadian Armed Forces with a new vehicle capable of answering the challenges of modern day warfare, Canada purchased, in 1978, 114 Leopard C1 main battle tanks from Krauss Maffei.

A portion of the fleet is used in Europe as part of our NATO commitments and the remaining vehicles are stationed in Canada and are split between an Armoured Squadron and a Combat Training School.

In March 1982, National Defence Headquarters tasked 202 Workshop Depot with the development of the technical expertise and facilities required to overhaul the Leopard C1 tanks.

Soon after, the Department of National Defence and the German Ministry of Defence signed a mutual logistics support agreement by which Canada agreed to overhaul annually 20 German Leopard A2

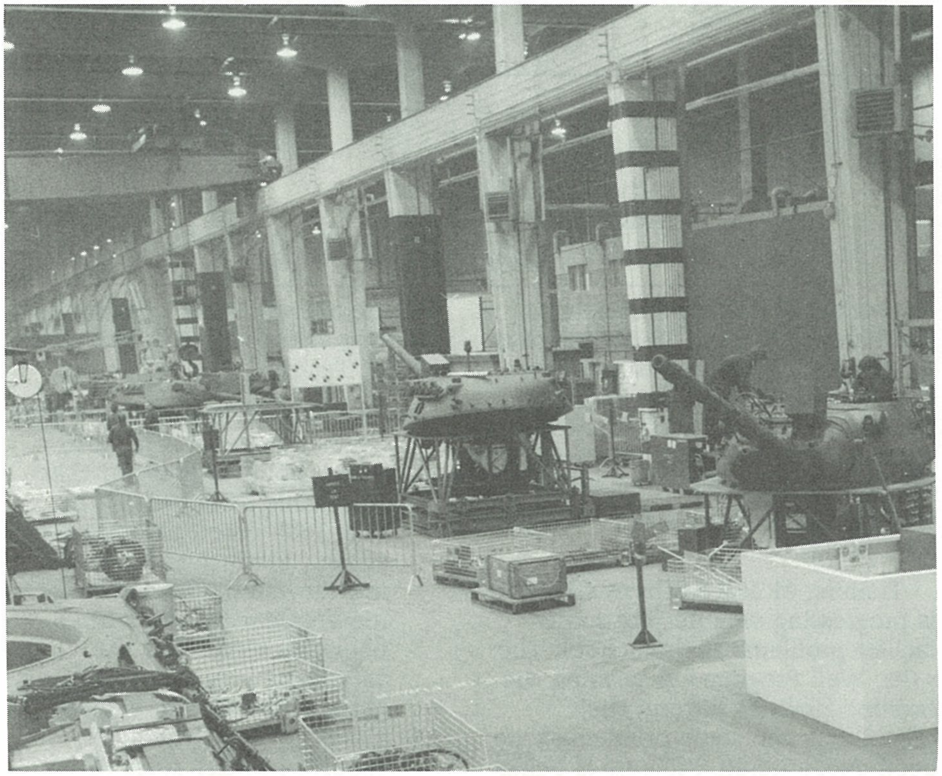


Fig 1: Turret assembly line

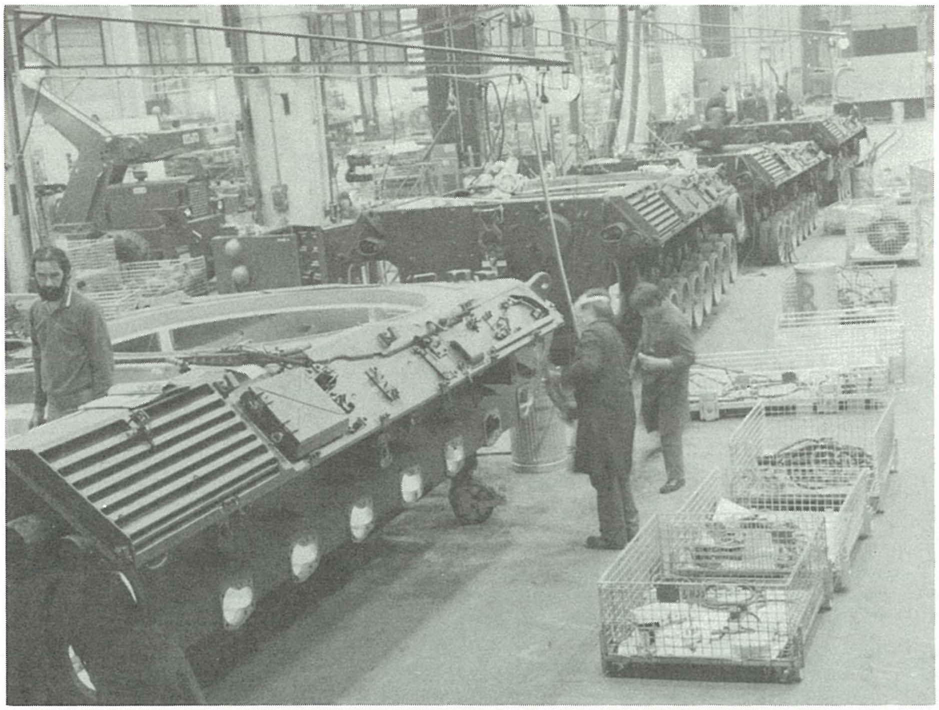


Fig 2: Hull assembly line

tanks based in Shilo, Manitoba, whereas Germany agreed to do an equivalent amount of work on Canadian equipment stationed in Germany.

A formidable task was indeed in front of us. The workshop had stopped performing repair and overhaul work on the Centurion tank in the early 70's and no third or fourth line support, such as test equipment or technical manuals, had been acquired or developed at the time the Leopard C1 was purchased.

The work force which had done overhaul work on the Centurion tanks had nearly all retired and, with a work force of 150 military personnel and 450 civilian employees, a great challenge was ahead of us as little or no technical expertise existed at the workshop in the overhauling of Leopard tanks.

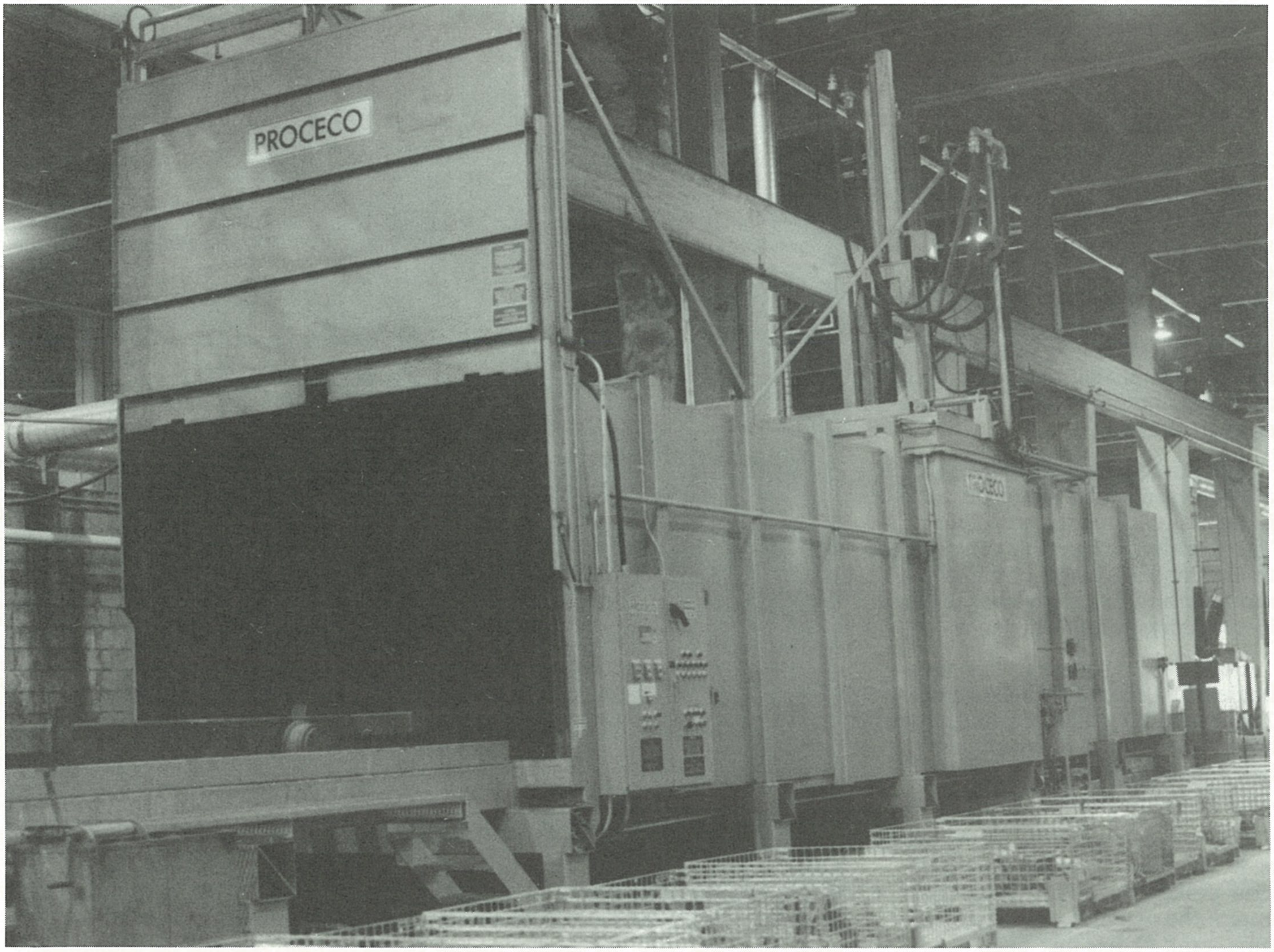


Fig 3: Industrial washing machine for the individual washing of the turret, hull and other components

Extensive preparatory work was required to develop new procedures and modern work methods. Special tools, jigs and test equipment had to be identified, purchased or manufactured in-house in order to equip the workshop adequately. A comprehensive training program was implemented and the setting up of new facilities, in addition to the renovation of existing ones, was also initiated. Lack of adequate facilities, non-existent test equipment and outdated work methods did not deter us from looking ahead with confidence and taking on the job with determination and enthusiasm.

By the time the workshop started overhauling Leopard tanks, the following new facilities were in place:

a. a 1.8 km test track,
b. optronic and electronic laboratories,
c. a hydraulic shop,
d. a new paint shop,
e. an industrial washing machine, and
f. a mechanized spare parts storage system.

In addition, movable supports, conveniently placed at each work station, provide compressed air, electrical outlets and light to the technicians working on the assembly line. Tools and expendable parts are also prepositioned at every work station, permitting their easy access and contributing to a significant saving of time.

We started from scratch and built a new organization based on current industrial engineering principles. These undertakings have contributed to the modernization of our work methods and to a significant increase in productivity and efficiency.

So far, 202 Workshop has overhauled 11 Leopard C1 tanks and 25 Leopard A2 tanks. Currently, we are in the process of overhauling five other Leopard C1 tanks and 20 Leopard A2 tanks.

The turnaround time per vehicle is 40 working days and the workload peak occurs when tank #16 enters the assembly line. At that time, tank #1 has just been overhauled.

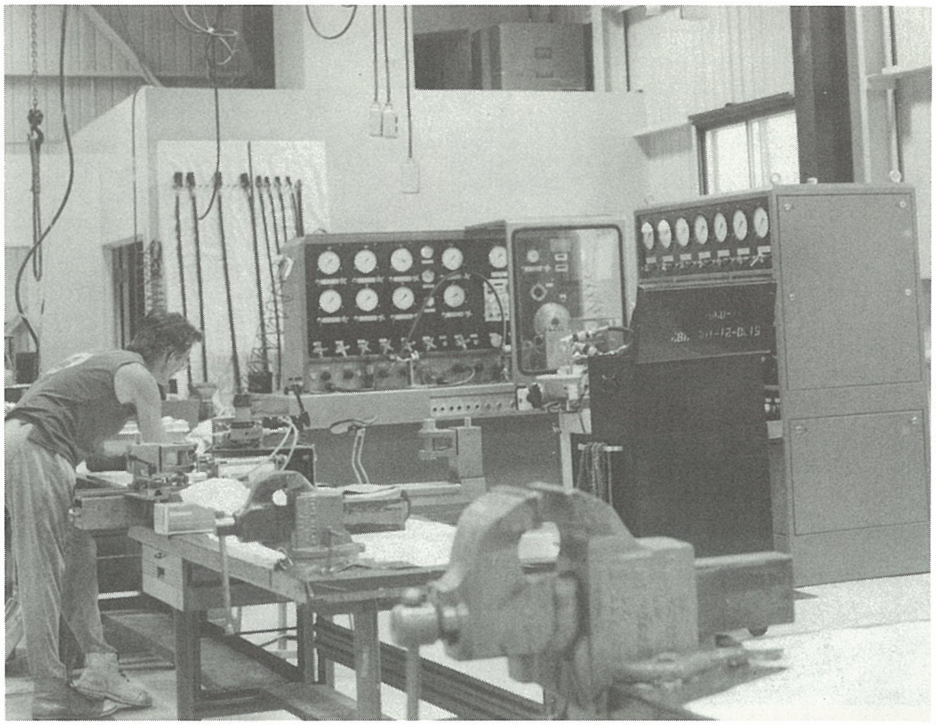


Fig 4: Hydraulic Shop

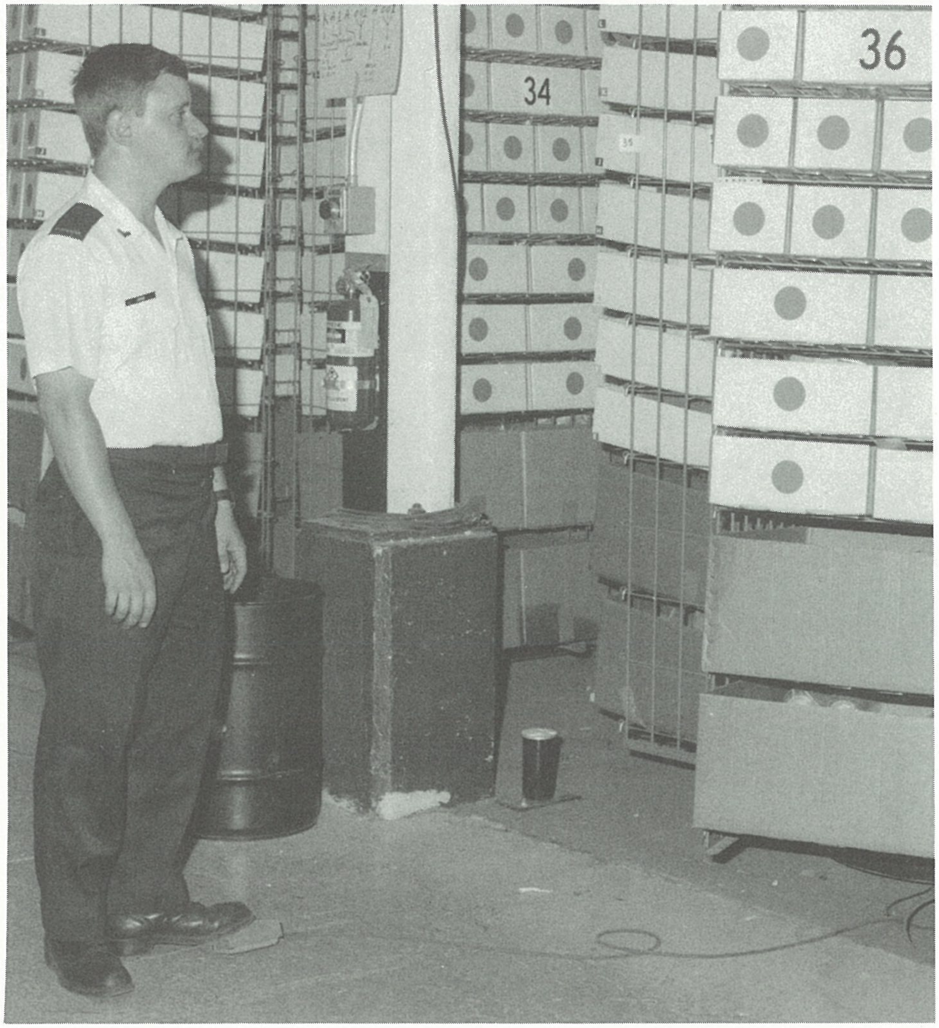


Fig 5: Cpl R. Jean, MOC 911, Material Support Section, 25 CFSD operating the mechanized spare parts storage system

Fig 6: MCpl B. Duchesneau, 411, 202 Wksp Dep, operates a walkie-stacker

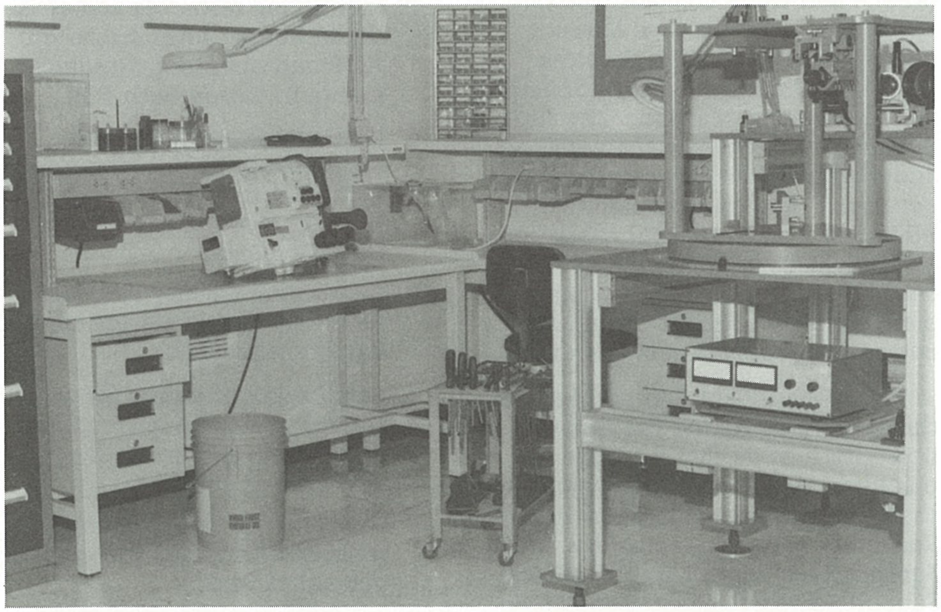


Fig 7: Partial view of Optronics lab

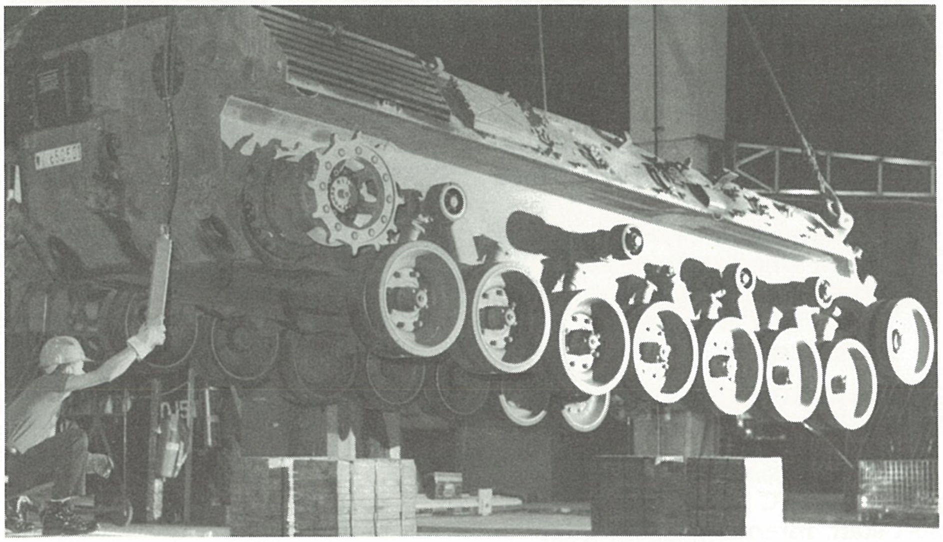


Fig 8: Partially disassembled hull being moved to another repair stage

Each tank goes through 16 different stages of repair that last 2.5 days each. From the time a tank enters the assembly line until it reaches the final stage, a considerable amount of work has been accomplished. It takes approximately 3,000 man-hours to completely overhaul a Leopard C1 tank and 2,700 man-hours for a Leopard A2 tank. Due to a tight work schedule, 202 Workshop Depot overhauls, in a five-month period, 25 Leopard tanks and spends 70,000 man-hours carrying out this task.

202 Workshop was indeed faced with a tremendous challenge when tasked to overhaul the Leopard C1 and A2 tanks. Careful planning, facility improvements and a dynamic approach to management at all levels have contributed to our ability to achieve our objectives since the beginning of the program and that, well within the time frames imposed.

But, most importantly, the basis of our success lies in a combination of technical knowledge and experience found among our planning, engineering and production personnel. Their team efforts and their enthusiasm towards the Leopard program have contributed to a competitive spirit now sweeping through our ranks and to our continued success.

LETE Update

Reliability and Maintainability Squadron: Sharpening the Competitive Edge

An On Site Manpower Evaluation Team (OSMET) report and a visit by the Associate Deputy Minister Material ADM(Mat) in 1974 were to change the face of the Land Engineering Test Establishment (LETE). In part, the OSMET report recommended that the Repair and Overhaul and production functions at LETE be moved to 202 Workshop Depot (WD) and the Test Functions of Maintenance Techniques (MT) and Repair Parts Scaling (RPS) Groups of 202 WD be moved to LETE. Following a visit to LETE, ADM(Mat) decided it would not be logical to try and duplicate basic facilities elsewhere. He directed that a program with the object of updating and refurbishing LETE be conducted. In his review of the OSMET report, in March 1974, Chief of Engineering and Maintenance recommended approval be given to moving MT and RPS Divisions of 202 WD to LETE, in Orleans. Over the next several years, a study group, formed under the direction of Director General Land Engineering and Maintenance (DGLEM), studied the intricacies of the move. While many deliberations led to the final move, one of the major considerations was housing. Studies of interim lodgings were deemed unfeasible and the move of RPS and MT Divisions to LETE was postponed pending completion of new facilities at the Orleans site.

A new chapter in the history of LETE began in August 1986. At this time the advanced party of RPS and MT Divisions, led be MWO Edwards and consisting of two civilians and four military personnel, arrived at the Orleans site. On 1 April 1987, the official transfer of responsibility for RPSD and MTD for 202 WD to LETE was completed.

RELIABILITY AND MAINTAINABILITY SQUADRON (R&M SQN)

The services formerly provided by the Land Maintainability Engineering Division of 202 WD are now provided by Reliability and Maintainability Squadron (R&M Sqn) LETE. The R&M Sqn Officer Commanding is a LEME Major. He is assisted by one LEME Captain as OIC Repair Parts Scaling Division (RPSD) and three civilians, the OIC Maintenance Techniques Division (MTD), the Information Services Data Link Analysis Officer (ISDLA), and the System Manager. The supporting staff includes senior military and civilian technicians and clerical personnel. The establishment of R&M Sqn is 54 personnel consisting of 25 civilians and 29 military. This establishment is frequently supplemented by contract or military personnel in support of large projects.

The role of R&M Sqn will be further explained during the detailed description of its divisions later in this article. At this point it is appropriate to define the segments of its title, Reliability and Maintainability. R&M Sqn provides Logistic and Technical Support Service to ensure Land Equipments achieve:

a. Reliability — the probability that an item will perform its intended function for a specified time interval and under stated conditions; and

b. Maintainability — the probability that an item will be retained or restored to a specified condition within a given period of time, when maintenance is performed in accordance with prescribed procedures and resources.

INFORMATION SERVICES DATA LINK ANALYSIS (ISDLA)

ISDLA consists of two civilian personnel, OIC ISDLA and one support staff. Internally ISDLA interfaces with MTD, RPSD, System Management and with LETE's Administration, Engineering Operations and Training sections. This section provides Administrative, Information Services and Data Link Analysis to R&M Sqn by:

a. identifying Automated Data Processing (ADP) requirements in liaison with System Manager (SM);

b. identifying resources and assisting in budget formulation for ADP and operational requirements in liaison with SM;

c. initiating Operational and maintenance (O&M) sub-projects requests for Technical Investigation Engineering Services Contract Demands;

d. performing Quality Assurance functions during closure of Squadron projects;

e. preparation of inputs for a variety of reports such as: mission scales, graphs, training and time accounting;

f. coordinating and planning the training of military and civilian personnel; and

g. controlling and monitoring R&M Sqn's SOPs.

To achieve these requirements, ISDLA maintains liaison with many outside agencies via LETE's tasking agency Directorate of Land Engineering Services (DLES).

SYSTEM MANAGER (SM)

The System Manager (SM) is responsible to the OC R&M Sqn, and performs the following duties:

a. identifies ADP requirements in liaison with ISDLA;

b. identifies resources and assists in budget formulation for ADP and operational requirements;

c. provides liaison with the DND computing community in support of R&M Sqn tasking; and

d. provides programming/analytical support to R&M Sqn in support of its taskings.

MAINTENANCE TECHNIQUES DIVISION (MTD)

MTD is headed by a civilian. The Division has 19 personnel, consisting of 15 military and 4 civilians. MTD is divided into the four trade oriented sections: Weapons/Material, Fire Control Systems, Vehicle, and Communication/Radar.

MTD provides the Canadian Forces Land element with technical information, advice and instructions to facilitate the maintenance of all types of equipment. MTD may be tasked by Project Managers and/or Life Cycle Material Managers (PM/LCMM) via DLES to:

a. perform maintenance analysis on equipment being brought into service or already in service, to ensure practical and economical maintainability practices and maintenance techniques are developed and implemented;

b. perform technical evaluations of equipment that have undertaken Reliability, Availability, Maintainability and Durability (RAM-D) trials;

c. provide technical assistance to PM/LCMM Integrated Logistic Support (ILS) and to interact, in those areas of MTD's scope and expertise in the Logistic Support Analysis (LSA) program;

d. investigate and evaluate equipment and maintenance support in order to produce draft Canadian Forces Technical Orders (CFTOs) pertaining to maintenance procedures of equipments; and

e. prepare technical reports after having carried out evaluation, investigation and technical research on equipment failures or suggestion award proposals.

REPAIR PARTS SCALING DIVISION (RPSD)

RPSD is headed by a LEME Captain. The division has 35 personnel, consisting of 12 military and 23 civilian positions. RPSD is subdivided into five trade oriented sections of Weapons/Fire Control Systems, Vehicle, Radar, Communications and Miscellaneous. There is a close working relationship between MTD and RPSD in that maintenance techniques have direct bearing on the type of spare parts required and their distribution.

RPSD provides advice on Technical and Logistic Support Requirement for Spare Parts to PMs/LCMMs. RPSD may be tasked via DLES to perform:

a. verification of manufacturers recommended spare parts list and recommendation of range and quantity for advance order buys according to maintenance philosophy;

b. preparation, review and update of Top-Down-Break-Downs used in Configuration Management and Initial Provisioning or working with contractors in an advisory capacity to avoid contradictions between Integrated Logistic Support and Supply requirements;

c. represents DLES as a member of the Initial Provisioning team, to provide a link between Supply Process and Maintenance Policy;

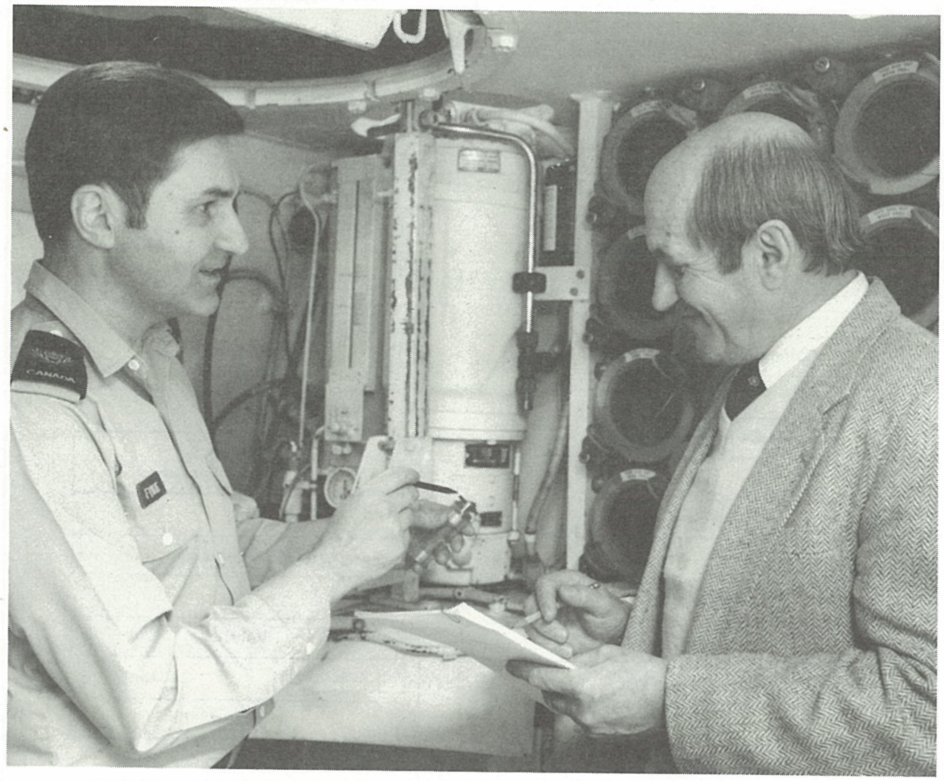
d. advises on the range and quantity of spare parts required at the various lines of maintenance allocated according to the Permissive Repair Schedule, the expected usage and the equipment's distribution;

e. advises on the use of Life Time Buys at Initial Provisioning (IP) Conferences to ensure availability of repair parts which will be unavailable after the production run has been completed;

f. verification of supply documents after Initial Provisioning Conferences (IPC);

g. running the Initial Provisioning Repair Parts Scaling (IPRPS) program (a sparing model) to distribute repair parts to first and second maintenance lines and optimize availability. If the IPRPS sparing model is not used, parts will only be distributed as far as depot;

h. determination of Follow-Up Buys at Mini IP Conferences when convened after major modifications have been made to the equipment;



The close working relationship between MTD and RPSD is shown on this picture as two weapons technicians, MWO Fink and Mr. Stadler of these respective Divisions, discuss the intricacies of the recent M109 upgrade.

j. preparation of the Draft Illustrated Repair Parts Manuals and Scales which are the MX series of CFTOs including appropriate prefacing pages and illustrations;

k. preparation of Overhaul Scales which can either take the form of special scales or the MZ series of CFTOs.

m. rewrites or updates of existing scale documents such as the MX or MZ series of CFTOs; and

n. producing mission or special purpose scales in cooperation with ISDLA for units going on major exercise, such as an RV, given the expected usage of the equipment and the sparing model.

NEW RESPONSIBILITIES

Since arriving from 202 WD, two more areas of diverse responsibilities are being introduced to the R&M family. The Land Equipment Item File (EIF) and Battlefield Damage Repair (BDR) Sections.

EQUIPMENT ITEM FILE (EIF)

The EIF maintenance responsibility for all Land equipments was transferred from contract to LETE/R&M Sqn on the 15 Dec 87, on a trial basis. This trial has proven successful and Director Procurement and Supply Services (DP Sup S 4) has indicated R&M should be formally tasked to perform EIF maintenance. Since no personnel positions were transfered, at presently, positions in the EIF section are borrowed from RPSD. The Director General Audit has been requested by DP Sup S 4, to verify the rationale of contracting the Equipment Support List (ESL) functions to private industry. It is unknown if this audit will produce additional staff but estimates done indicate the section at full strength may require four ESL clerical staff.

The EIF section is the responsibility of the RPSD Officer. The section consists, in a temporary state, of one military supervisor, two civilian clerks and one civilian contract position.

The EIF section is responsible for maintaining a data base consisting of over 600 ESLs for all Land equipments. An ESL is a top-down-breakdown of an equipment showing the latest equipment configuration with all relevant logistical support information. The EIF section holds a master file on each ESL showing all changes that have been processed or are pending further processing. The section works closely with LCMMs, PMs, DCI and Item Managers to ensure quick and accurate logistic processing of maintenance requirements.

BATTLEFIELD DAMAGE REPAIR (BDR)

To date BDR hasn't been assigned any manpower. This tasking has been undertaken within the resources of MTD and is the responsibility of the MTD officer.

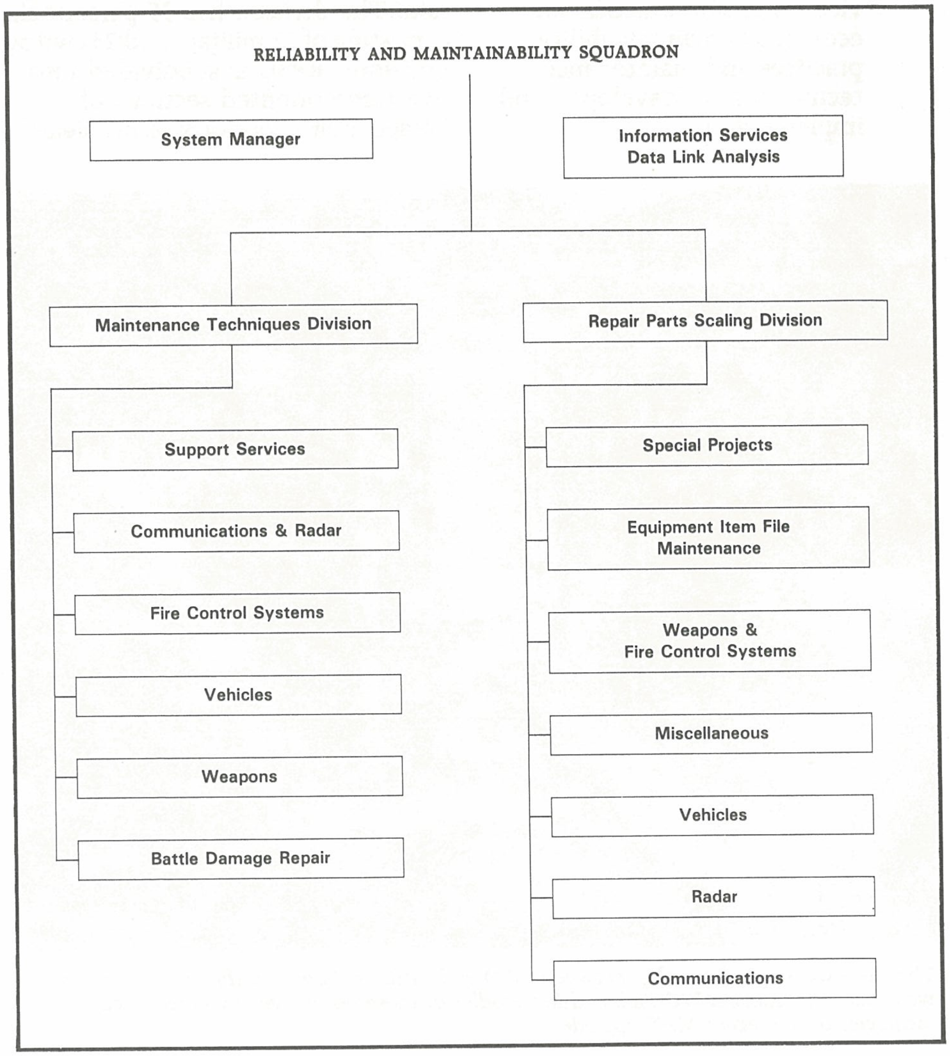
BDR can be defined as the repair of battlefield damaged equipment as fully and as quickly as possible within the constraints of an intense combat environment. Since operational requirements may limit resources on the battlefield, essential repairs may be performed to enable equipment to carry out, at least partially, one more mission.

Since early 1987, preliminary work and much discussion have been generated on the subject of BDR. As identified in the DGLEM Five Year Plan, a requirement existed within the Canadian Forces to develop a capability to complete repairs to military equipment under the concept of BDR. LETE has been assigned the mandate to develop the necessary expertise on BDR. In March 1988, LETE/R&M Sqn was tasked by DLES to:

a. gather information on BDR under aspects of concepts, techniques, training, organization and procedures;

b. catalogue the information under various subjects and make an inventory of available technical documents; and

c. recommend the focus of BDR following studies.


RELIABILITY AND MAINTAINABILITY SQUADRON
System Manager
Information Services Data Link Analysis
Maintenance Techniques Division
Repair Parts Scaling Division
Support Services
Communications & Radar
Fire Control Systems
Vehicles
Weapons
Battle Damage Repair
Special Projects
Equipment Item File Maintenance
Weapons & Fire Control Systems
Miscellaneous
Vehicles
Radar
Communications

Having completed the tasking identified in March of 1988, R&M Sqn is anxiously awaiting further BDR involvement. The current status of BDR is:

a. a second Draft BDR policy is being produced by DLES; and

b. R&M Sqn has been tasked to:
   (1) produce a catalogue of BDR techniques; and
   (2) produce a first draft BDR catalogue on Canadian Forces equipment by 30 Nov 89.

FUTURE GOALS

R&M Sqn looks to the future with emphasis on improving services and broadening horizons. Reduction in the time necessary to complete a tasking, improved awareness of the Sqn's capabilities within the Branch and the ongoing effort to improve the quality of services provided are being studied. To meet these needs the Sqn has concentrated on the following in an attempt to improve services:

a. increased in-house training to stay abreast with changing technology;

b. introduction of automated processes to replace functions now completed by hand:

c. education within the Branch on the services provided by the Sqn;

d. introduction of capabilities at Unit level to allow production of mission scales;

e. improved systems to upgrade existing part scales; and

f. close liaison with Commands and Units to evaluate and validate the success of current Sqn programs.

Efforts to broaden the areas of R&M responsibility are under review. The following areas are being seen as possible future R&M services to the Branch:

a. increased involvement in Battlefield Damage Repair (BDR);

b. development of a center of expertise on Integrated Logistic Support for the Branch; and

c. with the involvement of the Material Trade (MOC 441), evaluation of plastics, oils, fabrics, etc.

Reliability and Maintainability Squadron provides vital services to the Branch and plans to continue to meet new challenges and requirements.

ARTE ET MARTE

ETFC Update

A Twentieth Anniversary for the Canadian Technical School "ETFC"

By Capt JGL Vachon

HISTORIC

The Technical School, CFB St-Jean was inaugurated on 15 April 1969 by the Honourable Léo Cadieux, then Defence Minister. This was to be the first and only school with the task, as it is still today, of providing initial trades technical training in French for the military francophones.

On 31 July 1969, a first group of 15 students completed their Basic Electronics and Communication Training. This basic training was replaced on 14 September 1970 by a then new training concept in the Canadian Armed Forces, the Practical Oriented Electronics Training (POET). From 1969 to 1980, the Radio Technicians (221) training level 3 (TL3) course was also given at the School. On 15 November 1971, ETFC also inaugurated the Mechanical Training Company. The first French vehicle technician (TL3)

PERMANENT STAFF OF ETFC MECANICAL COMPANY – DECEMBER 1988

Back row (Left to right): *Pte MSC Ouellet, Mcpl JRD St-Jean, Mcpl JNG Champigny, Mcpl JPG Brisebois, Mcpl G Bibeau, Mcpl MLG Saint-Laurent, Cpl JAP Gouin, Mcpl JBA Bergeron, Sgt JD Santerre, Mcpl JG Duchesne, Mcpl JYWD Drolet, Mcpl JJ Dubois.*

Front row (Left to right): *Sgt G Poirier, Sgt JAAC Boucher, Sgt JMM Beaudoin, MWO JER Richard, Capt JGL Vachon, Mcpl AF Lamoureux, Mcpl JAD Taillon, Mcpl JVAS Dulac, Mcpl JPP Boissonnault.*

course 7101, which had begun on 16 November was graduated on 28 January 1972.

ORGANIZATION

Over the years, the School was restructured to meet the changing needs in the training of technicians. Today, it is organized in three separate functional groups: the HQ, the Electronics Company and the Mechanical Company.

HEADQUARTERS

The Commandant, Major Jean-Guy Dessureault, his secretary, Carole Arsenault and MWO Guy Therrien, the School MWO are part of this group. Under the command of Lt Robert Marion, we find the Administration, the Standards and the Personnel Awaiting Training Sections. A total of 2 officers, 10 NCMs and 2 civilians perform the command, control, support and the administrative tasks.

LEME PERSONNEL

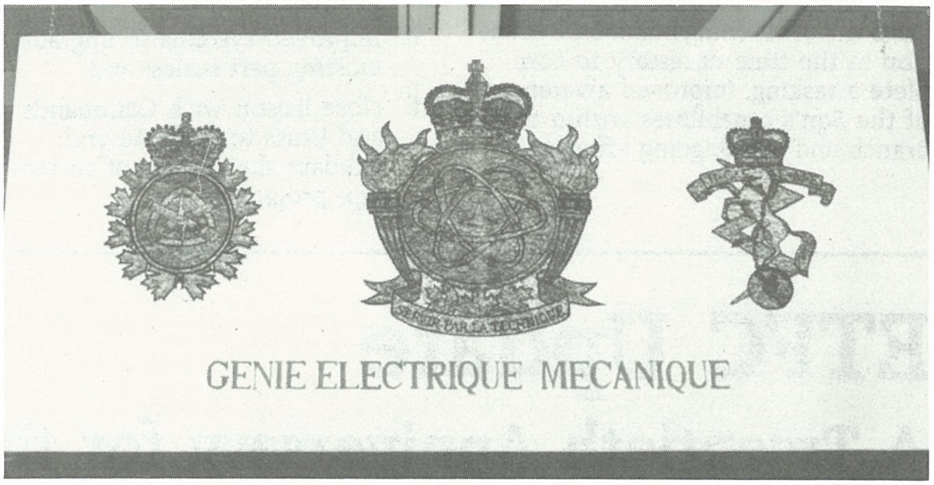
WO JERP Laurent (MOC 411), responsible for the Vehicle Training Standards Section is the only one physically detached from this Headquarters. His office is located in hangar 104, with the Mechanical Company. This close proximity facilitates his course evaluating functions. He is heavily committed to providing suitable French technical publications, the creation and the translation of examination question banks. He maintains a close liaison with the instructors and also ensures the liaison with the CFSEME Evaluation Platoon in Borden.

Sgt PJ Bourgoin (MOC 432) is responsible for the school personnel awaiting training section. He firmly controls up to 60 trainees which are employed in this section while waiting to begin training.

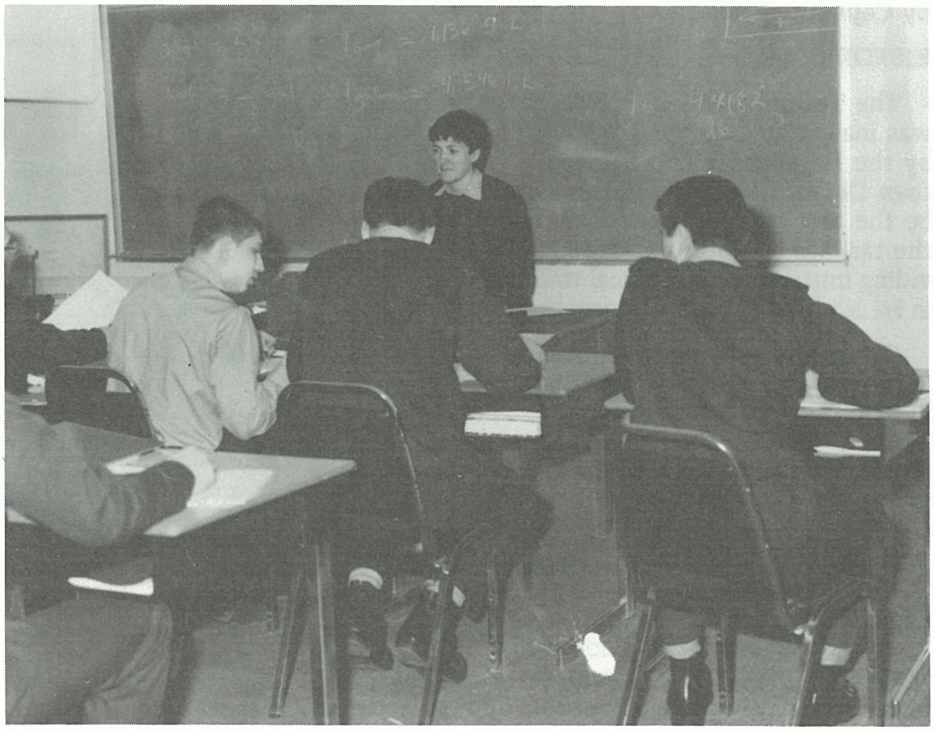
ELECTRONIC COMPANY

The Electronic Company is co-located with the School headquarters in building 129. The Company's permanent staff, comprised of one officer and 37 NCMs, dispense all three phases of the POET training. Approximately 350 students are taking from 30 to 95 training days depending on the need of their eventual trade. Following is the list of these trades with their corresponding POET course length:

MOC	Trade	Length
221	Radio Technician	95 days
222	Terminal Equipment Technician	"
223	Teletype and Cipher Technician	"
231	Radar Technician	"
524	Communication and Radar Systems Technician	"
431	Electro-Mechanical Technician	75 days
521	Integral Systems Technician	"
541	Photographic Technician	"
572	Air Weapons Systems Technician	"
714	Laboratory Technician	"
065	Naval Weapons Technician	30 days
332	Marine Electrician	"

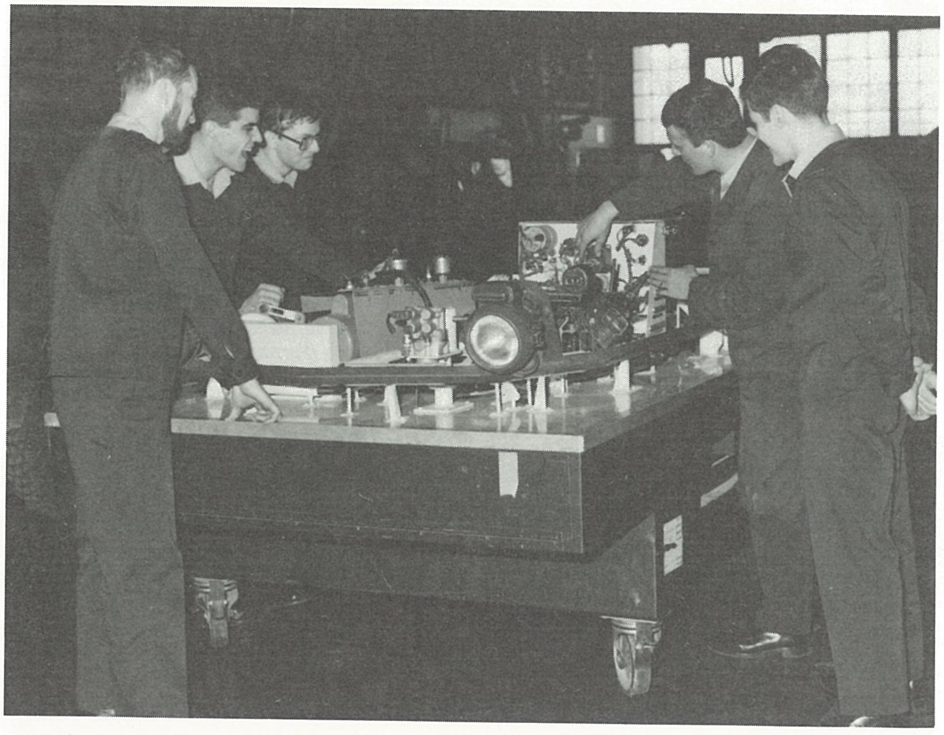


The Electrical Mechanical Engineers branch history is an important part of your young vehicles technicians. These crests were made by the personnel of the school waiting section.



Mcpl MCL Mailhot CEM 432, reviewing the mathematical conversion formulas with a group of vehicles technicians.

From left to right: *Pte ADP Dagenais, Pte RD Mears, Mcpl MLG Saint-Laurent and Pte D Conlin. The instructor maximizes the use of training aids to emphasize a teaching point to her anglophones students.*



From left to right: *Pte JAPP Bilodeau, Pte JEF Yargeau, Pte RRM St-Charles, Mcpl JVAS Dulac and Pte JRYP St-Pierre.*
This AVGP electrical systems training bench is an effective training tool for the students.

The students having completed the POET Course are posted to CFB Borden or CFB Kingston for their level 3 trade course. The majority of the students are selected for one of the above mentioned trades during their POET course at the School.

LEME PERSONNEL IN THE ELECTRONIC COMPANY

Lt Eric De Lafontaine, a LEME officer, is the OC of the Electronic Company. He is much involved with the coordination of the POET training and with the selection of candidates towards specific trades. He is also an excellent sportsman and takes part in most of the School's sports activities.

MCpl M.C.L. Mailhot (MOC 432) is one of the instructors with the Semi-Conductor Laboratory. Very polyvalent, she has, during the last two years and 9 months, taught in the Oscillator, the Logic and the Mathematic laboratories. She has also written and taught the new vehicle training mathematic lesson plan.

MCpl J.M.M. Flibotte (MOC 432) is employed in the Semi-Conductor laboratory. Posted at the School during the summer of 1988, he has spent most of his time at CFB Borden on a trade 6A course and TA instructional technique training.

MECHANICAL COMPANY

The Mechanical Company has, since its inauguration, been housed in hangar 104. The 19 NCMs and one officer conduct the vehicle technician TQ 3 training. All company members are of the 411 trade with the exception of the clerk and the tool crib attendant. Our clerk, Pte M.S.C. Ouellet (MOC 831) from the Navy, is a recent addition to the group and our tool crib attendant is a Supply technician lent from the Base supply Section and usually replaced yearly.

This year, of the 8 groups of 12 students that will take their TQ 3 vehicle technician training, 4 groups will be anglophones. The training conducted is as close as possible to that given at CFSEME. The course is divided into two separate phases, the technical and the Common LEME training.

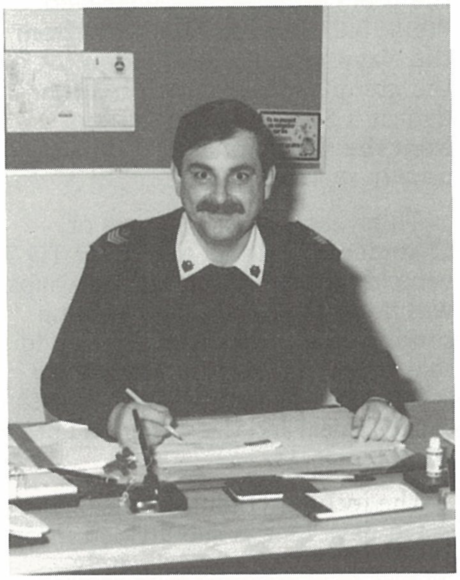
The technical training phase which is 116 days long is sub-divided into 4 laboratories of approximately 29 days each. During the last year, this training has been up-graded considerably with the implementation of a revised Course Training Standard and Course Training Plan which now include a mathematics performance objective.

The second phase of the course is devoted to the LEME Common Training. It has also recently been lengthened from 12 to 15 days. This training is conducted biannually.

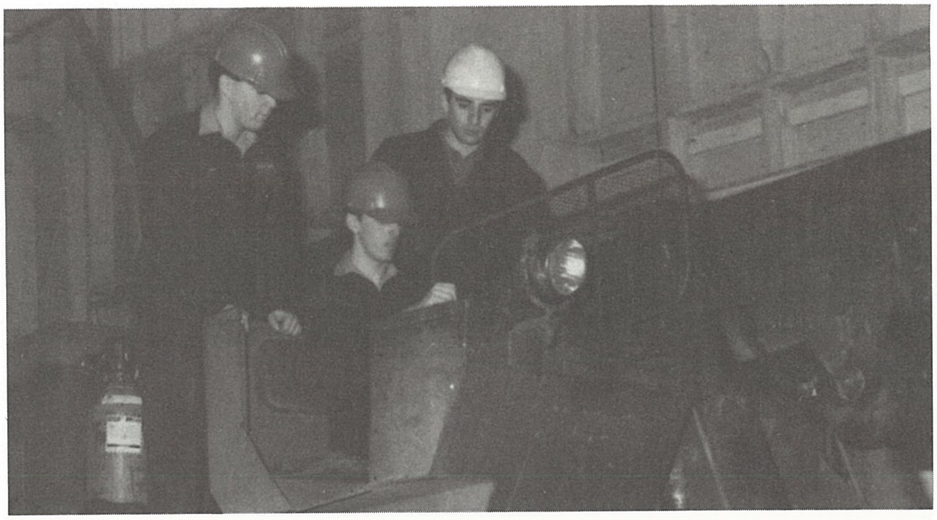
Each time the technical training is discontinued, the staff and the 4 groups of students in residence are regrouped as a vehicle maintenance platoon. Once the initial and theoretical training completed, the members of the platoon are deployed with their 26 vehicles, weapons and support equipment at the Garnison de l'Estrie (Farnham). Their tactical field training is practiced until orders are given to deploy in their last defensive position to better resist the enemy's shrewd and repeated attacks (MWO Richard, Sgt Santerre, MCpl Bergeron and MCpl Dulac).

CONCLUSION

During these last years, the members of the Technical School have proudly executed the tasks that have essentially remained the same since 1969. However, the courses have in time been improved to keep pace with the advance in technology. Maj Dessureault is especially proud to emphasize the hard work of his predecessors that have, with their staff, contributed to the School's twenty years of history.



Sgt PJ Bourgoin (MOC 432) is surprised that we are taking his photograph and wonder what we intend to do with it. At school since 1987, he has first taught with the direct current laboratory of Electronic Company. Since August 1988, he is the responsible of the School's personnel awaiting training section.



Under the watchful eyes of Pte JGRC Samson and of the instructor Mcpl JNG Champigny, Pte JJJ Grenon is familiarizing himself with the crane controls of an M62 5 Ton SMP wrecker.

It is 0845 hours, 16 November 1988, the members of the first vehicles packet are waiting the code word that will send them on to the Garnison de l'Estrie (Farnham). This is the beginning of the common LEME practical training phase.

During good weather, the installation of the temporary facilities is an enjoyable task. However to the young technicians the assembling of a large modular tent as shown in this photograph may appear to be a difficult task.